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FINAL

BEAVERHEAD NATIONAL FOREST

NOXIOUS WEED CONTROL PROGRAM

ENVIRONMENTAL IMPACT STATEMENT

Prepared By

Beaverhead National Forest
P.O. Box 1258
Dillon, Mt. 59725
May 1986

RONALD C. PRICHARD
Forest Supervisor
Beaverhead National Forest

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RECORD OF DECISION

BEAVERHEAD NATIONAL FOREST

NOXIOUS WEED CONTROL PROGRAM

ENVIRONMENTAL IMPACT STATEMENT

The U.S.D.A. Forest Service, Beaverhead National Forest has prepared an Environmental Impact Statement for a Noxious Weed Control Program for 1986. Four alterntive treatment methods were considered in detail:

1. No Action: Allow weeds to continue to spread.
2. Mechanical and Manual Treatment: Use mechanical (plowing, mowing, etc.) and manual (pulling, grubbing, etc.) control.
3. Mechanical, Manual, and Biological Treatment: Use mechanical, manual and introduce biological agents to aid in control.
4. Mechanical, Manual, Biological and Chemical Treatment: Control noxious weeds using mechanical, manual, biological and add chemical herbicide where they can be safely applied for an integrated control program.

Based upon analysis included in the Environmental Impact Statement, it is my decision to implement Alternative 4, an integrated noxious weed control program that combines mechanical, manual, biological and chemical, as appropriate.

This alternative appears to best meet objectives for the Forest's noxious weed control program, and offers the best options for coordinating with other noxious weed control programs by other agencies and individuals in this area. This alternative is in compliance with the Beaverhead Forest Plan.

The EIS projects that approximately 7680 gross acres of noxious weeds will be treated in 1986. Of these infestations, 5971 acres (75%) are scattered stands with less than 1% crown cover where individual plants will be hand treated; 792 acres (10%) are low infestations with 1-10% crown cover that will be hand treated; 823 acres (11%) are moderate infestations with 11-25% crown cover that will be hand treated; and 274 acres (4%) are heavy infestations with over 25% crown cover that may be hand treated or chemically treated with a vehicle mounted boom sprayer, depending on safety factors.

Implementation of this program is dependent on the level of funding and manpower available to treat noxious weed infestations. Priority will be placed on areas where treatment can be coordinated with other agencies and individuals who are treating weeds.

Priority will be placed, in order, on identifying, and educating publics concerning new weed species that may invade the Forest, in treating infestations of new wee species that may be found, in treating scattered stands of established weeds to prevent spread with emphasis on spotted knapweed, and in containing heavier infestations to prevent new outbreaks.

My decision to select Alternative 4 is subject to appeal pursuant to 36 CFR 211.18. Notice of appeal must be in writing and submitted to Ron Prichard, Forest Supervisor, Beaverhead National Forest, 610 N. Montana, Dillon, Montana 59725. Notice of appeal must be submitted in writing 45 days from date of this decision or 30 days after publication by the Environmental Protection Agency of the notice of availability of the Environmental Impact Statement, whichever date is later. A statement of reason must be filed within the 45 day period for filing a Notice of Appeal.

Dan Pence

for RONALD C. PRICHARD
Forest Supervisor

5/21/86
Date

PROPOSED BEAVERHEAD NATIONAL FOREST
NOXIOUS WEED CONTROL PROGRAM

Draft ( ) Final (x)
Environmental Impact Statement

Beaverhead National Forest
U.S. Forest Service
U.S. Department of Agriculture

1. Type of Action: Administrative

2. ABSTRACT: This EIS describes and evaluates the environmental impacts of implementing the proposed noxious weed control program for the Beaverhead National Forest. A Worst-Case Analysis of the impacts of herbicide use on human health is included.

The most effective and efficient suppression methods are proposed for use to control noxious weeds and poisonous plants. These weeds are reducing public rangeland productivity, spreading to nearby noninfested lands, and increasing the economic burden on private landowners and county, State and Federal taxpayers. State, Federal, local and private agencies and interests have launched coordinated programs to control noxious weeds in Montana. Alternatives analyzed include 1) No Action, 2) Mechanical and Manual Control, 3) Mechanical, Manual and Biological Control, and 4) Mechanical, Manual, Biological and Chemical Control. Alternative 4 is the Preferred Alternative. Significant environmental impacts of the preferred alternative include maintenance of rangeland values including native vegetation, coordination with efforts of other control interests, and control of noxious weed sources originating on National Forests that can further infest nearby lands administered by others. Important environmental and resource values would be protected from adverse effects.

Public comments received on this EIS will be considered in formulating the final EIS for the Forest noxious weed control program.

3. The final statement was transmitted to the Environmental Protection Agency (EPA) and made available to the public on May 30, 1986.

4. Public appeal period ends July 15, 1986.

5. For further information contact:

Dan Pence
Range Staff Officer
Beaverhead National Forest
P.O. Box 1258
Dillon, Mt. 59725

Telephone (406) 683-3987
FTS 584-5987

DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR

NOXIOUS WEEDS AND POISONOUS PLANT CONTROL PROGRAM

Covering Beaverhead National Forest System Lands in Beaverhead, Madison, Deer Lodge and Silver Bow Counties in Southwestern Montana.

TYPE OF ACTION: Administrative

RESPONSIBLE AGENCY:	RESPONSIBLE OFFICIAL:
Beaverhead National Forest P.O. Box 1258 Dillon, Mt. 59725	Ronald C. Prichard Forest Supervisor Beaverhead National Forest P.O. Box 1258 Dillon, Mt. 59725

FOR FURTHER INFORMATION CONTACT:

Dan Pence
Range Staff Officer
Beaverhead National Forest
P.O. Box 1258
Dillon, Mt. 59725

ABSTRACT: This draft environmental Impact Statement addresses alternatives for controlling noxious weeds and poisonous plants on the Beaverhead National Forest. Alternatives considered in detail include:

1. No Action: No action would be taken to control noxious weeds and poisonous plants.

2. Mechanical and manual treatment: Control of noxious weeds and poisonous plants would be attempted using mechanical (plowing, mowing, burning, etc.) and manual (pulling, grubbing, etc.) methods.

3. Mechanical, manual, and biological treatment: Control of noxious weeds would be attempted using mechanical, manual, and biological (insects, disease, grazing) methods.

4. Mechanical, manual, biological and chemical treatment: Control of noxious weeds would be attempted using mechanical, manual, biological, and chemical (herbicide application) methods.

Each Ranger District will prepare a site-specific environmental document to cover their annual noxious weed and poisonous plant control program.

SUMMARY

OVERVIEW

This DEIS is prepared pursuant to requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations for implementing NEPA, and the Department of Justice's procedures for implementing NEPA (28 CFR Part 61). This document is intended to be specific to actions anticipated to control noxious weeds and poisonous plants on the Beaverhead National Forest. It will also provide specific background information needed for the "tiering" of future project-specific analyses in accordance with the CEQ regulations for implementing NEPA (40 CFR 1502.20).

STATEMENT OF PURPOSE AND NEED (CHAPTER 1)

Purpose of this document is to analyze alternative control methods for noxious weeds and poisonous plants within the Beaverhead National Forest. Noxious weeds, and to a lesser degree poisonous plants, are a major concern to land managers, agriculture interests, wildlife interests, and others who are interested in rangeland management in Southwest Montana.

Ten major issues were identified by the interdisciplinary team (ID team) as representative of the public issues and concerns received during the scoping process. Several individuals, organizations and, agencies participated in the public involvement phase of this planning process.

The major issues addressed by this planning effort are:

Issue 1. The establishment of noxious weeds within native or desirable plant communities alters vegetative composition resulting in decreased forage production for livestock.

Issue 2. Wildlife, especially big game winter range, forage production declines with the establishment of noxious weeds.

Issue 3. Cover values for game birds and small animals declines with the establishment of noxious weeds.

Issue 4. The effectiveness of the combined interagency weed control program depends on the compatability and coordination of control efforts between agencies.

Issue 5. The establishment and spread of noxious weeds from forest system lands decreases agricultural investments on adjacent private lands and poses significant economic threat to landowners.

Issue 6. Livestock deaths occur on the Beaverhead National Forest due to heavy infestations of tall larkspur (**Delphinium occidentale**), a poisonous range plant when consumed by cattle.

Issue 7. Soil erosion is accelerated when dense stands of mules ears (**Wyethia** spp.) and knapweed (**Centaurea** spp.) become established and suppress the growth of more desirable soil binding plants.

Issue 8. Man's activities are a primary cause of the spread and establishment of noxious weeds.

Issue 9. Costs and the associated benefits vary with treatment methods.

Issue 10. Concerns exist that control methods for the treatment of noxious weeds and other undesirable range plants could adversely effect:

A. Public Health
B. Fish & Wildlife
C. Nontarget Vegetation
D. Threatened & Endagered Species of Plants & Animals
E. Water Quality
F. Erosion

DESCRIPTION AND ALTERNATIVE COMPARISON, INCLUDING PROPOSED ACTION (CHAPTER 2)

Alternatives considered in detail are (1) No Action, (2) Mechanical and Manual Treatment, (3) Mechanical, Manual, and Biological Treatment, and the Preferred Alternative (4) Mechanical, Manual, Biological and Chemical Treatment. Alternatives considered but eliminated from detailed study include aerial application of herbicides, and burning.

A brief description of alternatives considered in detail is provided below.

ALTERNATIVE 1: NO ACTION

Noxious weeds and poisonous plants would not be treated, resulting in uncontrolled spread to uninfested public and private lands.

ALTERNATIVE 2: MECHANICAL AND MANUAL

An effort would be made to control noxious weeds and poisonous plants using mechanical (plowing, discing, mowing, etc.) and manual (pulling, grubbing, etc.) methods. Infestations are generally small, scattered and on topography that will limit mechanical treatment. Manual treatment is expensive and labor intensive. Approximately 768 acres would be treated annually. Access restrictions would be imposed to protect some treated areas from re-infestation.

ALTERNATIVE 3: MECHANICAL, MANUAL AND BIOLOGICAL

An effort would be made to control noxious weeds and poisonous plants using mechanical, manual, and biological control methods. Acres treated manually would be similar to Alternative 2. Biological agents (insects and pathogens) would be utilized as they become available. Sheep would be grazed on scattered larkspur patches to help reduce the number of cattle deaths related to poisonous plant consumption.

ALTERNATIVE 4: MECHANICAL, MANUAL, BIOLOGICAL AND CHEMICAL

This alternative is similar to Alternative 3 with the addition of herbicides. Herbicide use increases program effectiveness, significantly improves the cost and benefits ratios, and provides an avenue of compatability for coordination with other State and local noxious weed programs. Approximately 7680 acres would be treated annually for the first few years. The number of acres treated annually will be reduced as infestions are reduced. Priority would be to eradicate new infestations, contain and eventually control old infestations, and routinely check and control weeds as necessary along heavily traveled rights-of-way and other points of initial invasion. This is the preferred alternative.

AFFECTED ENVIRONMENT (CHAPTER 3)

This chapter describes the environment that would be affected by implementation of the alternatives. The affected environment includes climate and air quality; geology and topography; soils; water resources; vegetation; fish; wildlife; threatened, endangered, and sensitive species; livestock, cultural resources; visual resources and recreation; wilderness and recreation management areas; and social and economic settings.

ENVIRONMENTAL CONSEQUENCES (CHAPTER 4)

Environmental consequences are the environmental changes that would be expected from implementing an alternative program. The varying amounts of activities and uses between alternatives result in differing levels of environmental consequences which are described in terms of physical, biological, social, and economic effects.

The following are brief comparisons of effects by alternative.

Air quality: Existing air quality is excellent. Except for a short-term localized mild odor associated with use of some herbicides in Alternative 4, no change is anticipated in any alternative.

Soils: Existing condition is good except for minor areas needing improvement. Some soil disturbance would occur on areas treated mechanically or manually under Alternatives 2-4. Under Alternative 4 (preferred alternative) there is the possibility of persistence of herbicides in the soil, in the areas that will be treated.

Waters: Existing condition is good with no detectable levels of herbicides in streams or groundwater. No changes will occur under Alternatives 1-3. Minor detectable levels of herbicides may enter streams immediately following treatment under Alternative 4.

Vegetation: Native and desirable plant communities would be reduced under Alternative 1-3 due to invasion by noxious weeds. Alternative 4 would allow native plant communities to remain intact, except for minor localized impacts on nontarget species in chemical treatment areas.

Animals: Forage production will be reduced significantly for livestock and wildlife as noxious weeds continue to expand under Alternatives 1-3. Livestock losses to poisonous plants will continue under Alternatives 1-3.

Livestock and wildlife will benefit under Alternative 4 as noxious weeds and poisonous plants are replaced by desirable vegetation. Herbicide concentrations proposed are well below levels that could impact animals.

Fish: Habitat is in fair to excellent condition, and control methods are not expected to adversely impact fish habitats.

Cultural Resources: No changes are anticipated under any alternative.

Recreation Resources: Recreational opportunities would be reduced as native vegetation is replaced by noxious weeds under Alternative 1-3. Some level of access restriction can be anticipated under Alternatives 2-4 as prevention stratagies are implemented to reduce the spread and establishment of noxious weeds. Short-term chemical smells and inferred health risks will necessitate special precautions, including signing and/or short-term closures, in developed campsites if they are treated.

Visual Quality: Visual quality will be reduced as native vegetation is replaced by noxious weeds in Alternatives 1-3. Mechanical treatment would also affect visual resources under Alternatives 2-4. Minor visual impacts will occur as some nontarget plants die from herbicide treatment under Alternative 4.

Wilderness and Special Areas: Noxious weed control will help maintain native vegetation. Alternatives 1-3 would allow noxious weed infestations to expand into these areas, adversely impacting native vegetation in wilderness and Resource Natural Areas. Effective control of noxious weeds in wilderness areas is anticipated under Alternative 4. Some travel and use restrictions, such as requiring the use of weed-free hay or pellets for horse feed, can be anticipated under Alternatives 2-4. Regional Forester approval would be necessary for pesticede application in wilderness areas.

Economic Conditions: Serious impacts can be anticipated to local economies as agriculture- related resources respond to expanding noxious weed infestations under Alternatives 1-3. Up to 56% of the Forest would become infested with noxious weeds resulting in up to 63% loss of desirable forage under these alternatives. The resulting loss to livestock and wildlife resources would be significant. Local labor would benefit from labor intensive manual treatment under Alternatives 2-3. Improved vegetative condition should result from Alternative 4, resulting in a slight improvement over current conditions.

Social Environment: The local social environment is heavily reliant on agriculture and wildlife related industry and opportunity. Any adverse impact on rangeland values will adversely affect opportunities in these fields.

Rangeland values and the related social environment will be adversely impacted as noxious weeds adversely impact forage production under Alternatives 1-3. Alternative 4 should sustain current rangeland values. Alternative 4 introduces herbicide use, which is objectionable to some individuals.

Human Health: No adverse impacts are anticipated under any alternatives, including use of herbicides as included in Alternative 4. Herbicide application will only occur in scattered, isolated areas, with concentrations well below any inferred to introduce health hazards to applicators or those who might encounter chemicals by chance.

SUMMARY OF HUMAN HEALTH RISK ANALYSIS

The human health risk analysis, also referred to as worst-case analysis, is required when there is incomplete or unavailable information. According to regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1502.22B).

Scientific uncertainty exists about the carcinogenicity of two of the three herbicides proposed for use (2,4-D and Picloram). The analysis addresses the risks to human health of proceeding with the preferred alternative. The analysis is formulated based on available information, using reasonable projections of the worst possible consequences of the proposed action. This analysis indicates an extremely low probability of risk or a catastrophic event. The analysis also evaluates projected impacts to health involving a spectrum of events considerably higher risks than what would be anticipated under the preferred alternative.

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CHAPTER 1 - PURPOSE AND NEED FOR ACTION

A. Introduction

The Beaverhead National Forest, United States Department of Agriculture, proposes to continue a program for control of noxious weeds on public lands within the Forest boundary. The program would apply to those lands administered by the Beaverhead National Forest within the counties of Beaverhead, Deer Lodge, Madison, and Silver Bow in the State of Montana.

The term "noxious weed" is a legal designation. Federal, county and State laws designate certain plant species as "noxious" and require landowners to control them. The Federal Noxious Weed Act of 1974 defines a" noxious weed" as a plant which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock...or the fish and wildlife resources of the United States or the public health. The Montana County Noxious Weed Management Act defines a "noxious weed" as any exotic plant species established or that may be introduced in the state which may render land unsuitable for agriculture, forestry, livestock, wildlife, or other beneficial uses and is further designated as either a State-wide or county-wide noxious weed. Noxious weed and poisonous plant control, as used in this document, is in contrast to other rangeland plant control programs of the Forest Service involving highly competitive plants. "Target plants" in this document refers to both noxious weeds and poisonous plants collectively. (See Appendix F for a list of Target Plants.)

In the conceptual sense, weeds are introduced species that have the potential to significantly disrupt native plant communities and displace native species. A "weed" is no more than a plant outside its desired location or a certain plant where it is not wanted. Environmental impacts resulting from a decrease of desirable species and an increase in undesirable species is the essence of what is referred to as the noxious weed problem.

Seven state and county noxious weed species are reported to be established on the Beaverhead National Forest. Several other noxious weed species have become established on public and private lands surrounding the Beaverhead National Forest and the spread of those weeds is an increasing threat to Forest System lands. Only a small percentage of the lands infested with noxious weeds and poisonous plants is within the boundary of the National Forest. This imbalance of noxious weed occurrence does not reduce the need for Forest Service cooperation to contain and control these plants in conjunction with state, county, federal, and private land managers. The opportunity currently exists to treat noxious weed infestations while they are small and scattered. This option appears more economical and environmentally sound than waiting until infestations expand to heavily infest large areas and significantly reduce native forage production. Noxious weeds are a serious threat to the environmental resources and if effective weed management is to occur, the problem must be addressed on a broad scale with cooperation by affected groups Ali, 1984; French, 1984; Hahnkamp and Pence, 1984; Lacey and Fay, 1984).

Awareness of the noxious weed problem is largely confined to the agricultural and ranching communities. However, the nature and extent of the problem transcends land ownership and uses. Noxious weed infestations impact nonagricultural sites such as wilderness, roadless and special interest areas, dispersed recreation sites, campgrounds, wildlife habitats, road rights-of-ways, timber harvest areas, mineral operation sites, and open areas of public rangelands. Public awareness of the noxious weed problem is increasing as shown by public interest in the Forest's proposed control program.

The spread of noxious weeds on both public and private lands within the four affected counties presents an ecological threat. Noxious weeds are agressively superior competitors when introduced into plant communities. Invasion by noxious weeds lowers rangeland habitat condition for both livestock and wildlife, reduces crop yields, and stimulates economic losses (Chase, 1985; Bucher, 1984; French and Lacey, 1983).

Weed control implementation will be directed toward preventing weed establishment; containment of those weeds currently established; and reduction of infestations to manageable levels.

B. National, Regional and Forest Planning

Planning in the Forest Service is conducted under the authority of the Multiple-Use Sustained Yield Act of 1960, the Forest Range and Renewable Resources Planning Act of 1974 (RPA), and the National Forest Management Act of 1976 (NFMA) (USC, 1960, 1974, 1976). In addition, two Federal laws guide weed control on Federal lands: The Carlson-Foley Act (PL 90-583) and the Federal Noxious Weed Act (PL 93-629 Sec. 9(a)) **(See Appendix C).**

C. Coordinated Planning

The Montana County Noxious Weed Management Act of 1985 provides direction for a coordinated noxious weed program covering all land within the districts owned or administered by a Federal agency. County weed boards in all four counties have solicited cooperation from the Beaverhead National Forest and the Bureau of Land Management, the State Highway Department, Railroads, and private landowners. The East Pioneer Experimental Stewardship Program (ESP) has also requested assistance from the Forest in control of noxious weeds. The Beaverhead National Forest intends to continue the coordinated control efforts with agencies in or adjacent to the planning area.

D. Further Environmental Analysis

This DEIS provides an analysis of the major noxious weed and poisonous plant control methods for consideration on the Forest. Although this DEIS is specific to the Beaverhead National Forest, a more intensive analysis of site specific treatment will be completed by each District before treatment (see Appendix E). The National Environmental Policy Act (NEPA) of 1969 (PL 91-140), provides a tiering procedure whereby decisions can be made at the Regional, Forest or District levels for a given program or project. This procedure permits an agency to focus on broad issues that can be resolved at higher levels, and defer site specific issues which require decisions at a local level. Interdisciplinary analysis will be based on the Final EIS and other supportive documents such as the Forest Plan, Allotment Management Plans and Timber Sale Plans.

E. Public Participation

In accordance with NEPA, this DEIS analyzes possible impacts on the human environment from utilizing a variety of weed control techniques.

A December 4, 1985 Federal Register Notice announced a scoping period for the Beaverhead National Forest Program. Approximately 20 comments were received in response to public meetings, local news releases, written requests for concerns, and personal contacts.

An interdisciplinary team (ID team) of specialists was assembled to conduct the analysis and prepare the DEIS. Their first task was to consider concerns and issues raised in the letters and comments received as a result of scoping. Approximately 20 comments were received concerning the proposed control program. These public and inhouse concerns were analyzed and grouped into the 10 major issues or concerns listed below.

Issue 1. The establishment of noxious weeds within native or desirable plant communities alters vegetative composition resulting in decreased forage production for livestock.

Issue 2. Wildlife, especially big game winter range, forage production declines with the establishment of noxious weeds.

Issue 3. Cover values for game birds and small animals declines with the establishment of noxious weeds.

Issue 4. The effectiveness of the combined interagency weed control program depends on the compatability and coordination of control efforts between agencies.

Issue 5. The establishment and spread of noxious weeds from Forest system lands decreases agricultural investments on adjacent private lands and poses significant economic threat to landowners.

Issue 6. Livestock deaths occur on the Beaverhead National Forest due to heavy infestations of tall larkspur (**Delphinium occidentale**), a poisonous range plant when consumed by cattle.

Issue 7. Soil erosion is accelerated when dense stands of mules ears (**Wyethia** spp.) and knapweed (**Centaurea** spp.) become established and suppress the growth of more desirable soil binding plants.

Issue 8. Man's activities are a primary cause for the establishment and spread of noxious weeds.

Issue 9. Costs and the associated benefits vary with treatment methods.

Issue 10. Concerns exist that control methods for the treatment of noxious weeds and other undesirable range plants could effect:

A. Public Health
B. Fish & Wildlife
C. Nontarget Vegetation
D. Threatened & Endangered Species of Plants & Animals
E. Water Quality
F. Erosion

CHAPTER 2 ALTERNATIVES - Including the Proposed Action

A. Introduction

This chapter presents the description and comparison of alternatives for management of noxious weeds on the Forest's land and resources. Differences among alternatives include types of treatments, treatment levels, and constraints on noxious weed management to benefit other resources. Alternatives were developed under the assumption that each alternative could be implemented. Each alternative, except for the No Action Alternative, incorporates prevention measures for reducing further establishment or spread of noxious weeds.

Prevention stratagies are critical to the effectiveness of a noxious weed control progam and necessary in order to reverse the current trend of noxious weed establishment. Increased public and employee awareness of noxious weed identification, causes of spread, and control methods through Information and education programs is an important aspect of prevention. Specific areas of noxious weed infestations may require a comprehensive prevention program tailored to site specific needs and will be addressed in individual project designs at the district level. Prevention stratagies will be acclerated when noxious weeds threaten or have become established in locations difficult to treat or control due to terrain, access, or proximity to environmental resources requiring special protection. Areas requiring protection may include, but are not limited to, municipal watersheds, designated wilderness areas and areas of special concern, habitats for threatened and endangered plant or animal species, and locations where weed infestations can not be effectively controlled without restricting use of the site. Special attention will be given to infestations on Forest lands that pose a threat of spreading to adjacent uninfested lands.

The level of prevention will be tailored to compliment the effectiveness of the control program and is subject to varying degrees of need. A noticeable reversal in the trend of noxious weed infestations could result in a less intensive prevention program, however prevention will always be needed in order to maintain an acceptable level of control over noxious weeds. Prevention techniques may include, but are not limited to the following:

1. Travel restrictions for recreational livestock or vehicle use in specific areas.

2. Trucking rather than trailing livestock across lands known to be infested with noxious weeds prior to placing livestock on Forest grazing allotments.

3. Requiring certified weed free hay on Forest system lands.

4. Prompt seeding of disturbed sites (roads, mining sites, timber cutting units, fence lines etc.).

5. Equipment wash downs for earth moving and other large machinery prior to entry on Forest system lands or predeparture from infested areas within the forest boundary.

6. Assessment of special fees to projects having ground disturbing activities for revegetation costs and noxious weed control costs.

7. Increased public awareness programs utilizing information and education programs, news and radio broadcasts, campaign slogans and posters, and demonstration plots.

8. Train field personnel to identify weeds and take appropriate action.

Control of noxious weeds can be categorized in the following levels:

1. Prevention - avoiding contamination or infestation by a target plant still absent from the area.

2. Eradication - complete kill or removal of target plants, including all plant structures capable of reproduction (above ground parts and underground stems or spreading roots).

3. Control and Maintenance - manipulation and management to reduce and maintain target plant populations at acceptable levels.

The goals of the Forest's noxious weed control program are to prevent new target plant infestations, eradicate newly established and smaller infestations of primary target plants, and control or confine large infestations of established target plants.

1. Range of Alternatives

An adequate range of alternatives was developed by first formulating the alternatives that were required by Federal regulations or policy. This included alternatives that reflected the current program (represented by Alternative 4), and alternatives that responded in different ways to the issues and concerns.

The adequacy of the range of alternatives considered was determined by evaluating them against the issues and concerns. Analysis of these comparisons showed that there was an adequate range of proposed control programs.

Alternatives considered but eliminated from detailed study are prescribed fire control and aerial application of herbicides. Prescribed fire treatment was eliminated because of its ineffectiveness in controlling noxious weeds. Fire often stimulates plant growth and reproduction and at best only provides temporary control. Individual infestations on this Forest are less than 100 acres in size and plant densities for the most part are scattered or low **(See Appendix I)**. Treatment of small acreages is not practical using prescribed fire methods. Aerial application of herbicides is best suited to large acreages and therefore not a reasonable control measure for consideration in this document.

B. Alternatives Including the Proposed Action

Alternatives 2-4 are a combination of two or more treatment methods. Four alternatives were considered in detail. Each alternative, except for the No Action Alternative, has various levels of control associated with the different treatment methods. Alternative 2 combines manual and mechanical methods; Alternative 3 adds biological control; and Alternative 4 is a combination of all treatment methods considered. Individual treatment methods are described below, followed by a description of the alternatives.

1. Manual Methods

Hand pulling and hand tools (shovel, hoe, pulaski) represent the most common techniques for manual control. These methods are highly labor intensive, requiring periodic retreatment ranging from every 2 weeks during the growing season to once annually, depending on the target species. These methods have been moderately successful in controlling annuals and biennials but are generally ineffective in controlling creeping perennials, such as leafy spurge, Canada thistle, and tall larkspur.

2. Mechanical Methods

Mowing and tilling are two types of mechanical treatments than can be used to prevent plants from producing seed when treated in the bud stage or earlier. Efforts repeated every 21 days during the growing season can deplete the underground food source of some perennials. This method would have an adverse effect on nontarget plants in isolated areas where used, simply due to the nonselective nature of the treatment. Some species, such as spotted knapweed, have demonstrated the ability to produce seedheads and continue to grow and propagate below the height that would normally be mowed. Areas disturbed by tillage need to be reseeded with desirable species to assist in preventing reinvasion by weeds and to reduce potential soil erosion. Reseeded areas will be rested from livestock grazing during the initial growth period to ensure establishment. Tillage will not be used where weeds (such as leafy spurge, for example) having rhizomatous roots are established, as tillage breaks up the rhizomes of creeping perennials and would effectively spread those species. All land disturbing actions which result from the noxious weed treatment program should be preceded by cultural resource review in compliance with with the National Historic Preservation Act of 1966.

3. Biological Methods

Biological control of noxious weeds is a relatively new science with substantial areas requiring research. However, biological control has been used successfully against some species since at least the 1930's. Biological control is very complex because of specific requirements of control agents (insect or pathogen) for attacking the target plant. For example, insects may not attack some plants of the same species due to chemical differences between the plants. Although two plants of the same species may appear identical, insects may differentiate between the plants, resulting in less effective biological control.

Biological control reduces seeds and vigor of the target plants, thus resulting in a reduction of target plant densities and spread of the plant. This type of control method does not eradicate the target plant, but has been effective in controlling some weeds. Unfortunately, sufficiently effective agents have not been identified for species of concern in this EIS.

Insects, pathogens and grazing by sheep would be used as biological control methods for noxious weeds and undesirable plants under Alternatives 3 and 4. The status of biological control research is shown in Appendix A. Sheep would be used when possible to graze tall larkspur which is poisonous to cattle.

Areas where insects and pathogens naturally occur or are introduced should be protected from other types of control methods in order to maintain the density of host plants.

The potential of introduced enemies affecting nontarget vegetation is very slight with insects. Tests are done on the insects and if they feed on any of the numerous beneficial plants available, they are no longer considered as a potential control agent (Story, 1979).

Two seedhead attacking flies are available for spotted knapweed and diffuse knapweed. These flies do not reduce the existing population densities of knapweed. They attack the seedhead and reduce the amount of viable seed produced. The gall fly, Urophora quadrifasciata, which was introduced into Canada from Europe, has migrated into Montana. This gall fly has been found near Dillon, Twin Bridges, Alder and Ennis as well as other parts of western Montana. These areas are the closest known areas to the Forest with these flies. Urophora quadrifasciata was found at 81 of 85 sites surveyed throughout all knapweed infested areas of the State. The four sites lacking the fly were located in Silver Bow and Madison Counties (Western Agriculture Research Station, 1986). Due to the migratory ability of this fly, the probability of their establishment on the Forest is good. The other seedhead fly, Urophora affinis, has been released near Virginia City. This fly was specifically introduced in Montana in 1973 and was found at only 35 of the 85 sites. The fly is concentrated primarily in the west central counties (Jim Story, Western Agriculture Research Station, personal communication, 1986).

Two new moths, Agapeta zoegana and Pelochrista medullana were recently released on spotted knapweed in the Bitterroot Valley.

Two root-mining moths were introduced on spotted and diffuse knapweed in 1984 but there is not sufficient data available to determine their usefulness at this time. One seedhead attacking moth is also available but does not appear to work well under the conditions present in Montana.

A native fungus has been found attacking both spotted knapweed and leafy spurge in Montana. One insect, a defoliating moth, is showing promise as a biological control agent for leafy spurge.

A seedhead attacking weevil is available for musk thistle control. It is widely distributed in Montana and is easy to collect in the spring.

Biological control represents a long-term solution for species which have an effective control agent. As control agents are proven safe and effective through research, the opportunities to use biological control agents will increase.

4. Herbicide Methods

Species characteristics, stage of plant growth, and season of application are important in prescribing herbicide treatments. Plant susceptibility to herbicides varies with the local environment and season throughout the Forest. Information on the most effective timing of applications appears in published research, State Weed Control Guides, and on herbicide labels.

Information concerning the proposed herbicides is provided in Appendix D, on herbicide labels, and in the following documents: Pesticides Background Statement and supplements (USDA, Forest Service 1984), Environmental Fates and Impacts of Forest Use Pesticides (Ghassemi and others 1981), Transmission Facilities Vegetation Management Program EIS (U.S. Department of Energy, Bonneville Power Administration 1983), and Environmental Effects of Vegetation Management Practices on DNR Lands (Newton and Dost 1981). Herbicides will be applied and monitored in accordance with Forest Service Manual direction, FSM 2150, 3400.

Herbicides are applied in several ways, depending upon the treatment objective, accessibility and topography of the treatment area, target species, expected costs, equipment limitations, and potential environmental impacts.

Hand applications include backpack spraying, hand held Micron Herbies (a gravity fed, battery operated atomizer), and broadcast spreading (granular formulations). Backpack sprayers are operated at low pressure and low volume and generally release herbicide through a single nozzle.

Vehicle mounted sprayer (hand-gun or boom) applications would be used in open areas that are readily accessible by vehicle. The boom would be used only where feasible to treat concentrated weed infestations. The hand-gun would be used for spot treatment of weeds and only up to ten feet of live water.

C. Coordinated Planning

The Beaverhead National Forest has been working cooperatively on weed control through county weed boards, the East Pioneer Experimental Stewardship Program, and the Bureau of Land Management. The primary goal has been to eradicate outbreaks of potential new invaders, and to contain and reduce current infestations of weeds that have become established on or adjacent to the Forest. More formal agreements will be developed with county weed boards to document these objectives.

Priority classes have been developed to assist in the cooperative control efforts.

Priority I: Potential New Invaders: Emphasis on education and awareness of noxious weed species that do not yet occur on the Beaverhead National Forest.

(a) Initiate continuing education and awareness programs to help Forest Service personnel, cooperators, and public land users recognize Priority I weeds. Options include cooperation with local agencies, establishment of noxious weed herbarium specimens, distribution of available publications, photographs or color prints of noxious weed species and use of demonstration plots.

(b) Forest Service administrative sites, offices, remote stations, and pastures, having noxious weed infestations will receive highest priority for eradication.

(c) Management jurisdiction shall, at least, on an annual basis, share information on their respective noxious weed treatment programs and established priorities.

(d) The Forest weed data base will be updated when identification and documentation of new invaders occurs and appropriate action will be taken as described in Priority II.

Priority II: Eradication of New Invaders: The highest priority of treatment will be given to new invading noxious weed species. A key factor in treating Priority II weeds is to prevent conditions that allow them to become established. Total eradication is the goal for weeds of this priority. Components of this treatment includes:

(a) Highest priority in funding.

(b) Take appropriate isolation and eradication measures as soon as a new invader is officially identified. Take immediately effective noxious weed control measures to prevent the species from going to seed.

(c) Initiate surveys of lands adjacent to the area to insure all infestations have been identified.

(d) Identify and treat the cause(s) of the noxious weed infestations to reduce the possibility of reentry.

Priority III: Established Infestations: Weed species in this priority have become so established and spread to the extent that eradication does not appear feasible. Components of this treatment priority include:

(a) Containment and prevention of further establishment.

(b) New "breakouts" from the main infestation or nucleus will be treated as soon as possible.

(c) Methods used on main infestations will consider the practicality and cost-effectiveness of the method as compared to the likelihood of success. When feasible, the main body will be treated with the objective of short-term control and eventual eradication.

(d) Biological control will be used on main infestations where successful agents are available.

(e) Management practices will be used in conjunction with control activities. These management practices include, but are not limited to:

1. Promoting the introduction/growth of both native and non-native species of vegetation that will better compete with noxious weeds.
2. The movement and/or use of livestock.
3. The movement and/or use of vehicles.

D. PROJECT DESIGN AND MONITORING STUDIES

1. Project Design

Each District on the Forest will prepare an environmental document to address the site-specific considerations of their control programs. All project designs will incorporate standard mitigation measures. Projects may require additional mitigation to protect environmental concerns. **Appendix E** states which standard mitigations will be incorporated in each District level environmental document.

2. Monitoring

Monitoring will be conducted in order to evaluate the effectiveness of the program in general and of the individual techniques. These study techniques are invaluable in determining if the desired results are being achieved and if nontarget species are being maintained or actually enhanced. A Forest data base has been structured to track noxious weed species, specific locations of both current and new infestations, information concerning evidence of biological agents, chemicals and method of application, and sites receiving retreatments. Additionally, pretreatment survey information will be included in order to evaluate impacts on nontarget vegetation and environmental resources receiving special protection measures identified in project designs. The State of Montana developed an inventory method which has been adopted by the Forest, the Bureau of Land Management and the local county weed boards. This cooperative inventory effort lends itself well to monitoring the spread and control of noxious weeds within the areas of concern, regardless of jurisdiction.

ALTERNATIVE 1. No Action:

The goal of this alternative is to manage the Forest resources without implementation of a comprehensive noxious weed control program. Biological agents (insects) which have become established will remain, however no effort will be made to further their establishment. Chemical treatment of noxious weeds would not be continued. Methods for preventing the establishment and spread of noxious weeds would not be initiated. The No Action Alternative meets NEPA and Forest Management Act requirements for development of a "no action" alternative.

ALTERNATIVE 2. Manual and Mechanical Treatment

The goal of this alternative is to confine present infestations and prevent establishment of new infestations without the use of biological controls or chemical treatments. Methods such as hand pulling, grubbing, mowing and tilling would be used. Manual control would be limited to target plants without rhizomatous root systems (canada thistle, leafy spurge, white top). Mechanical control would be limited to small areas where environmental impacts could be minimized. Biological control efforts would not be increased. Methods for preventing further spread and establishment of noxious weeds would be initiated.

ALTERNATIVE 3. Manual, Mechanical and Biological Treatment

The goal of this alternative is to reduce or eliminate noxious weeds without the use of chemical treatment. This alternative will provide increased distribution of existing biological agents and introduction of new biological agents as they become available. Domestic sheep grazing would be used where effective. Manual and mechanical treatments as described in Alternative 2, would be incorporated where effective. Methods for preventing further spread and establishment of noxious weeds would be initiated.

ALTERNATIVE 4. The Proposed Action (PA)

The goal of this alternative is to aggressively control noxious weeds by implementing a comprehensive program which includes the use of chemicals. Manual and mechanical treatments would be used where most effective or where chemical risks are high. Biological controls will be introduced and distributed in areas where establishment would be effective. Chemicals will be applied where environmental concerns can be protected. Measures for preventing further spread and establishment of noxious weeds would be initiated.

Target plants are scattered across the Forest and have been inventoried by species as well as density class. Seventy-five percent of all the weeds currently inventoried on the Forest have a density rating of less than one percent canopy cover for a total of 7,687 acres of scattered infestations. Appendix I shows total acres of noxious weeds by species and density class. The majority of individual applications would be limited to treating individual plants within small areas scattered over large tracts of land mostly between 1 to 5 acres in size. Exceptions are those sites where resource activities have resulted in larger acreages of disturbances, such as timber clearings. The most common herbicide mixture for noxious weeds on the Beaverhead National Forest involves 1/4 pounds per acre acid equivalent Picloram plus 2 pounds per acre acid equivalent 2,4-D. This mixture appears most effective against spotted knapweed. The mixture may be increased up to 1 pound picloram per acre for some specific target species such as leafy spurge. Actual application rate per acre is normally significantly less, because of the scattered nature of infestations.

E. COMPARISON OF ALTERNATIVES

The associated impacts for each alternative are described in detail in Chapter 4. A summary of the impacts is presented in **Table II-1** to assist decisionmakers and reviewers in evaluating the alternatives.

Table II-1. Summary of impacts by alternative.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Air Quality	Good to excellent	No change from existing environment.	No change from existing environment.	Slight temporary chemical odor present in areas treated with herbicides.
Soils	Gradual increase in allelotrophic toxins in soils as noxious weeds increase.	Gradual change towards Alt. 1 situation as noxious weeds increase.	Same as Alternative 2	No significant change. Some persistance of herbicides in soils, more likely in arid areas.
Waters	Slight increase in sediment as noxious weed infestations increase.	Same as Alternative 1	Same as Alternative 1	Some detectable levels of herbicides may enter streams from drift and runoff. overall impact to water resources is insignificant; no impact to groundwater expected.
Vegetation	Uncontrolled spread of weeds on the Forest and adjacent lands. No treatment of poisonous plants. Significant spread of noxious weed seeds to adjacent lands. Noxious weeds replace native vegetation.	Some degree of control of target plants but continued increase of some plants (creeping perennial plants less controlable). Significant spread of noxious weeds to adjacent land. Noxious weeds replace native vegetation	Control slightly better due to increased level of biological agents. Significant spread of noxious weeds to adjacent lands.	Increased production of grasses, isolated losses of some nontarget plants. Native plant communities essentially remain intact.
Animals Livestock Wildlife	Production would be reduced for livestock, and certain wildlife species, mainly big game. Loss of livestock from ingesting poisonous plants. Potentially significant impact bv noxious weeds on individual key big game winter ranges with heavy infestation.	Where manual and mechanical treatments fail to control weeds, forage and habitat (small animals and game birds) would be reduced. Loss of livestock from ingesting poisonous plants would continue.	Slightly better situation would occur with the increased populations of natural enemies for some noxious weeds. Manual and mechanical treatments would continue to provide limited control of most target plants.	Nontarget vegetation may be damaged or killed in some isolated areas. Where weeds are replaced by more desirable species the effect would be beneficial to livestock and wildlife. Reduced loss of livestock from poisonous plants. Herbicide application rates would not effect livestock or wildlife.
Fish	Habitat and fish populations would remain unchanged.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Visual Resources and Recreation	Adverse impacts by target plants in recreation areas. Reduced visitor use. Loss of scenic values on uncontrolled areas.	Adverse impacts by target plants. Reduced visitor use.	Slight improvement over Alternative 2 in the long term.	Low probability of scenic degradation. Visitor use increase.
Wilderness and Special Areas	Degredation to native plant communities by noxious weeds.	Some control; some degradation to native plant communities.	Same as Alternative 2 with slight chance of improvement over the long term.	Control of noxious weeds. Slight loss or injury of individual nontarget plants Wilderness and special area qualities remain intact.
Economic conditions	No positive impact to local economies. Highest level of livestock losses and agricultural investments, and wildlife.	Benefical impact to local economies based on labor intensive control effort; livestock and wildlife losses remain high.	Slightly better than Alternative 2 in the long term, livestock and wildlife losses remain high.	Maximum benefical impact to local economies. Minimizes livestock and wildlife losses.
Social Environment	Generally acceptable to those who oppose the use of herbicides. Negative response from agricultural community, county, State, and Federal agencies.	Same as Alternative 1. Negative response from agricultural community.	Same as Alternative 1. Somewhat less negative response from agricultural community	Unacceptable generally to those who oppose control with herbicides. Acceptable to agricultural community, and cooperating agencies.
Human Health	No risk of adverse impacts from use of proposed herbicides. Toxic plants cause minor impacts to humans.	No risk of adverse impacts from use of proposed herbicides. Toxic plants cause minor impacts to humans.	Same as Alternative 2.	No adverse impacts expected from use of proposed herbicides.

Table II-2 shows the relationship between the alternatives presented in the DEIS and the generalized issues and concerns of public and private land managers in the affected area.

TABLE II-2

Issues	Remarks
1. Forage Production	Under Alternatives 1 & 2 as high as 70% reduction in forage on better rangeland sites will occur. (John Lacey, pers. con.) Alternative 3 will provide a slight improvement over Alternatives 1 & 2. Forage production would be maintained or improved with Alternative 4.
2. Big Game Winter Range	Same effects for each alternative as Issue 1.
3. Wildlife Cover Values	Noxious weeds decrease cover value for game birds and small animals. The effects of each alternative would be the same as in Issues 1&2.
4. Program Effectiveness	Alternatives 1, 2 & 3 would not be compatible with cooperating agencies. Alternative 4 would be most effective.
5. Economic Threat	Economic losses would continue under Alternative 1. Alternatives 2 & 3 would slightly benefit the local economy. Alternative 4 would have a positive impact to the local economy.
6. Posionous Plants	Alternative 1 would have an adverse effect on livestock, Alternative 2 would not be effective in controlling tall larkspur. Alternative 3 would provide localized improvement with the use of domestic sheep. Alternative 4 would have a positive impact in reducing livestock deaths.
7. Soil Erosion	Soil erosion due to dense stands of mule's ears and knapweed would continue under Alternative 1. Alternative 2 would not effectively control either plant species; Alternative 3 would be slightly more effective on knapweed. Positive effects would result with Alternative 4.
8. Cost Benefits	Alternative 1 would have a negative impact due to increased noxious weeds and associated resource losses. Alternative 2 costs outweigh the benefits gained. Alternative 3 would be slightly better than Alternative 2. Alternative 4 would provide the best cost benefit ratio over time.

9. Effect of Treatment on:

(a) Public Health	Alternative 1 would adversely effect human health (dermal & respiratory reactions). No risks are expected with Alternatives 2 & 3. A low probability of adverse effects would occur with Alternative 4.
(b) Fish	No adverse impacts occur with Alternatives 1, 2 and 3. Low probability of adverse effects is associated with Alternative 4.
(c) Wildlife	No adverse impacts occur with Alternatives 1, 2 and 3, except for loss of forage. Loss of native forage will develop significant, long-term impacts in alternatives 1-3. Low probability of adverse effects is associated with alternative 4.
(d) Nontarget Plants	Allelopathic toxins from knapweed will adversely impact native vegetation under alternatives 1 and 2. Minor risk associataed with biological control impacting nontarget species. High risk in localized, small areas occur with Alternative 4 due to chemical impacts on nontarget plants.
(e) T & E Animals	No risks occur with Alternatives 1, 2 and 3, except for forage loss. Low probability of risks associated with Alternative 4.
(f) T & E Plants	Allelopathic toxins from knapweed will impact native vegetation in alternatives 1 and 2. Minor risk associated with Alternative 3 due to biological control agents affecting nontarget plants. Low probability of adverse effects from chemicals associated with Alternative 4 due to mitigation measures in site specific analysis.
(g) Water Quality	Slight increase in sediment under alternatives 1-3. A low probability of adverse effects is associated with Alternative 4.
(h) Soils	Alternative 1 would allow some localized soil erosion in sites occupied by wyethia and knapweed due to the exclusion of desirable plants. Some localized risks associated with tillage in Alternatives 2, 3 and 4. Low probability of residual chemicals in soils occurs with Alternative 4.

CHAPTER 3 AFFECTED ENVIRONMENT

A. Introduction

This chapter discusses the causes of noxious weed infestations on the Beaverhead National Forest; describes the current situation and environmental components that may be affected by the implementation of a comprehensive weed control program.

Several activites directly influence the establishment of noxious weeds. Primary factors include, the competitive advantage of noxious weeds over more desirable plant species, soil disturbance, seed transport by large equipment, seed transport by recreational vehicles, dissemination by livestock and wildlife, and downstream transport of seed. Soil disturbing activites are only partial causes for noxious weed establishment. Noxious weeds have established and spread in many undisturbed areas on the Forest due to their advantageous ability to suppress the growth of other more desirable species.

Introduction of noxious weeds is closely associated with transportation routes. Forest weed inventory maps shows the spread of weeds closely follows main travel routes with newer weed infestations appearing on secondary Forest system roads. Travel along roadways and trails introduces noxious weed seed into uninfested areas. Once established, the noxious weeds spread in response to natural dispersal agents of wind and water.

Noxious weeds are non-native species originating in Europe and Eurasia and have a distinct competitive advantage over native vegetation. Most non-native plants become established and spread rapidly due to the absence or ineffectiveness of natural control agents.

Most poisonous plants of concern are native and increase in acreage in a cyclic nature. Unpalatable poisonous plants can increase through a competitve advantage gained by wildfire, overgrazing, and ground disturbance. In some cases where poisonous plant competition increases, it is necessary to reduce poisonous plant density to meet land management objectives.

B. Affected Environment

1. Location and Description

The Forest is located in the southwest portion of Montana east of the Continental Divide and contains portions of Beaverhead, Silver Bow, Deer Lodge and Gallatin Counties. Interior mountain ranges include the Beaverhead, Madison, Tobacco Root, Gravelly, Pioneer, Snowcrest, and Fleecer Mountains. The land area confined within the Forest protection boundary comprises approximately 2,218,683 acres, of which approximately 70,000 acres are other than Forest Service jurisdiction, including the State of Montana, Bureau of Land Management, and private.

2. Climate

The winters on the Beaverhead are relatively cold and dry. The Continental Divide, which comprises most of the western boundary of the forest, blocks most of the moist maritime weather systems from the Pacific Ocean. Winter temperatures of -50° Farenheit are not uncommon.

The summer climate is relatively cool and dry. Temperatures can reach 100° F in the lower elevations but are not sustained for very long. The average growing season is short, ranging from 30 days in the upper elevations to 150 days in the valleys. Most of the milder sites are off Forest Service and in the valley bottoms.

Annual precipitation ranges from 12" in the valley bottoms to upwards of 50" in the mountains. About 75% of the annual precipitation falls as snow between October and April, with the remainder as either convective storms in the summer or frontal storms in the spring.

3. Soils

The soils occurring on the Beaverhead National Forest vary significantly in particle size, mineralogy, temperature regime, depth, consistence, and other major and minor characteristics. Taxonomically, most of the Forest is represented in four taxonomic orders (Alfisols, Mollisols, Inceptisols, Entisols) with minor representation in three others (Histosols, Aridisols, Vertisols). Tens of subgroups in at least twenty families are defined in these orders.

The dominant factor controlling soil type on the Beaverhead is the parent material, or rock type, from which these soils are forming. The rate of soil formation and development is largely controlled by climate and micro-climate.

Forest-wide, the kinds of soils that will be the ultimate repository of much of the pesticides that may be used to kill weeds cannot be easily generalized. There will be some areas treated on soils that will pass the pesticides (depending on the chemical used) relatively quickly, unless they are degraded by soil organisms, into the subsoil or into groundwater. These would generally be sandy loam and coarser textured soils, and/or soils with low organic matter, low content of hydrated oxides of aluminum and iron, and neutral to basic pH. Other soils will hold the chemicals virtually indefinitely, due to adsorption to soil constituents, until the chemicals are eventually degraded by soil organisms. These would be the opposite types of soils given above, i.e., generally loams and finer textures, relatively high content of organic matter, relatively high content of hydrated oxides of aluminum and iron, and acidic pH.

4. Waters

A. Surface Water: The Beaverhead Forest includes a range of moisture regimes from the northern conifer forests in the mountains to the arid and semi-arid rangelands in the valleys. Precipitation is concentrated in the mountains. Peak streamflows occur in the spring, however, summer thunderstorms can produce high flows on a local basis.

Rivers and streams in forested areas are generally perennial and of good quality, with low dissolved solids. Streams in rangelands can be either perennial or intermittent.

The forest supplies water to the Jefferson and Madison basins, two of the three headwaters of the Missouri River. Forest Service lands produce the majority of the water that flows in these systems. The Jefferson basin contains both the Beaverhead and Big Hole Rivers which, along with the Madison, are considered Blue Ribbon fisheries by the State of Montana. They are of national importance in terms of recreational value. Other uses of Beaverhead National Forest water include aesthetics, municipal supplies, hydropower generation and irrigation.

There are no data to determine background values for herbicides on National Forest streams, however, since there has been virtually no use of herbicides on the forest the levels should be undetectable.

b. Groundwater: Groundwater occurence on the Beaverhead is variable, depending on the geologic formation in any given area. Generally most of the groundwater is found in the deep alluvial deposits making up the valey floors and is located off-Forest. Groundwater recharge areas are, however, found at the higher elevations. Local high water tables are associated with riparian zones throughout the Forest, and movement of subsurface water to the streams can be relatively rapid.

5. Fish

Fish species found on the Forest include cutthroat, rainbow, brown, brook, and golden trout, as well as arctic grayling and mountain whitefish. The Forest forms the headwaters of the Madison, Big Hole and Beaverhead Rivers which are "Blue Ribbon" trout streams of national significance. Many of the tributaries to these larger streams provide spawning and rearing habitat to these and other downstream fisheries and influence both the quality and quantity of water flowing into them.

The fisheries on the Forest may depend on insects associated with riparian vegetation for food.

For a more detailed description of the fisheries resource on the Forest, refer to Chapter 3, page 19 of The Beaverhead National Forest Final Environmental Impact Statement (FEIS-1986). A copy of the FEIS is on file at the Supervisor's Office in Dillon, Montana.

6. Wildlife

The Beaverhead National Forest provides habitat for approximately 385 wildlife species such as elk, moose, mountain goat, bighorn sheep, whitetail deer, mule deer, pronghorn antelope, mountain lion, black bear, birds, small mammals and fur bearers. Upland game birds such as blue, ruffed, spruce and sage grouse depend on insects and/or forbs associated with the proposed control areas. Big game also depend on the forage produced in sagebrush and grassland and riparian habitats associated with the proposed control areas.

For a more detailed description of the wildlife resource on the Forest, refer to Chapter 3, pages 15-18 of the Beaverhead National Forest Final Environmental Impact Statement (FEIS-1986). A copy of the FEIS is on file at the Supervisor's Office in Dillon, Montana.

7. Threatened and Endangered Animals

The Forest provides habitat for the endangered bald eagle and gray wolf, the threatened grizzly bear and potential habitat for the endangered peregrine falcon.

The endangered bald eagle migrates through the Forest in the spring and fall. The larger rivers near the Forest do support some wintering bald eagles. The majority of the migration and wintering activity is not on the Forest. There are three active bald eagle nests in the southeast portion of the Gravelly Range.

The endangered gray wolf is an occasional visitor to portions of the Continental Divide southwest of Dillon. No occupied wolf habitat has been delineated on the Forest.

The threatened grizzly bear does utilize portions of the Madison Range and is an occasional visitor of the Tobacco Root Mountains and the Gravelly Range.

There is no known occupied peregrine falcon habitat on the Forest.

The endangered whooping crane is a summer resident known to occur at the Red Rocks Lake National Wildlife Refuge. No known use occurs by the whooping crane on the Forest.

There are no threatened or endangered fish species occurring on the Forest. The cutthroat and arctic grayling are classified by the State of Montana as "Species of Concern".

For a more detailed description of the threatened and endangered animal resource on the Forest, refer to Chapter 3, pages 15-16 of the Beaverhead National Forest Draft Environmental Impact Statement (DEIS-1986). A copy of the DEIS is on file at the Supervisor's Office in Dillon, Montana.

8. Livestock

Cattle and sheep grazing is one of the primary uses of the Beaverhead National Forest. Domestic horses also graze on the National Forest but to a lesser extent. All domestic livestock combined graze a total of 190,000 Animal Unit Months (AUM's) per year. Approximately 2 percent of this total is grazing use by recreational transportation livestock. Currently, 216 permittees utilize 173 active grazing allotments on National Forest lands. Livestock graze approximately 574,000 acres or 26% of the land on the Beaverhead National Forest.

In the EIS area livestock producers with grazing permits on the National Forest depend on forage from the Forest for approximately 3.5 months or about 30% of their annual feed requirement. Livestock production is a major industry within the general area.

9. Vegetation

The five major vegetative communities which presently contain noxious weeds and poisonous plants on the Forest are grasslands, sage foothills, riparian, and Douglas-fir or lodgepole pine timber types. The majority of noxious weeds are present on the lower elevation slopes which are dominated by natural range species such as bunchgrasses, forbs and shrubs. Many noxious weeds occur in highly productive sites for wildlife habitat and provide a large portion of the forage for both ungulates and livestock. Noxious weed populations in timber types are for the most part limited to cleared sites and road rights-of-way. Allotment management plans provide site specific vegetative types and range vegetative conditions for each District grazing allotment on the Forest. Lands not included with grazing allotment boundaries are not intensively inventoried or mapped by vegetative types

During the past four years approximately 2412 acres of weed infested rangelands were treated with herbicides on the Forest. Noxious weeds treated included Canada thistle, musk thistle, Russian knapweed, spotted knapweeed, Canada thistle, leafy spurge and houndstongue. Biological control agents (insects) are believed to have established on the Forest from nearby introductions in the past few years. The exact numbers, species and locations of biological agent populations on the Forest is not known at this time, however, plans to inventory their presence and effectiveness are included in the monitoring section of Chapter 2.

10. Threatened, Endangered, and Sensitive Plants

Endangered plants are species in danger of extinction throughout all or a significant portion of their range. Threatened plants are not now endangered but are likely to become so within the forseeable future throughout all or a significant portion of their range. Sensitive plants are species not yet offically listed but undergoing a status review.

There are no plant species occuring on the Forest classified as threatened or endangered. Penstemon lemhiensis (Lemhi beardtongue) may occur on the Forest and is listed as a candidate for Federal listing by the US Fish and Wildlife Service as a threatened or endangered species. Inventory work done by the Montana Natural Heritage Program (MTNHP) reports P. lemhiensis may occur wholly or partially on a private inholding within the Forest boundary. Field surveys are needed to verify the presence or absence of P. lemhiensis at a second location near Badger Pass adjacent to the Forest. P. lemhiensis often occupies areas with a high percentage of bare ground and is dependent on naturally disturbed sites, such as surfaces with soil slippage. The species is highly palatable to both livestock and ungulates.

Saxifraga tempestiva (Storm saxifraga) an endemic species listed as globally threatened by the MTNHP, and classified "rare" by the Montana Rare Plant Project (MRPP), is known to occur at two locations on the Forest within the West Big Hole Planning Unit. This species occupies habitats near or above timberline.

The Nature Conservancy has listed Haplopappus macronema (Discoid goldenweed) as critically endangered in Montana. This species occurs on high rocky slopes at mid-to-high elevations in the mountains, and is believed to be present in the Pioneer Planning Unit in the vicinity of Storm Peak.

Two other species which the Nature Conservancy ranks as globally and State endangered, Astragalus scaphoides (Bitterroot milkvetch) and Sausserea weberi (Sausserea), occur near the Forest and are expected to be within the Forest boundary.

The Montana Natural Heritage Program's inventory of plant species and plant associations which are rare, endemic, disjunct, threatened, or endangered throughout their range or in Montana, vulnerable to extirpation from Montana, or in need of further research is annually revised as new data becomes available. This inventory is the basis for a pending Memorandum of Understanding between the MTNHP and the USFS for a yearly contract agreement which will provide annual printouts of sensitive species. Appendix H lists the plant species of special concern developed by the MTNHP.

11. Timber

A significant amount of the timber harvested on the Beaverhead has been trucked into the Bitterroot Valley, Deer Lodge, and Livingston areas. These areas are heavily infested with noxious weeds, especially spotted knapweed. Logging equipment and haul trucks from these areas frequently carry weed seeds. As a result, numerous noxious weed infestations are associated with ground disturbance in cutting units, or road construction, maintenance and travel relating to timber harvest. Firewood cutting and recreation traffic following logging activity and road construction has also aided in spreading weeds.

Most weeds associated with timber harvest are located along roads. Some old clearcuts, especially in the Big Hole and Timber Creek on the Sheridan Ranger District, also have significant noxious weed problems.

12. Visual Resources and Recreation

Visual resources consist of the land, water, vegetation, animals, and other natural or manmade features visible on lands administered by the Beaverhead National Forest. Roadways, trails and streams pass through a variety of characteristic landscapes where natural attractions such as open rangeland, rugged mountain ranges, lakes and steams can be seen. Also included are areas such as timber sales, mineral operations, and livestock grazing areas where some cultural modifications exist. These lands have been assigned visual quality objectives (VQO's) during Forest Land Management Planning. The VQO's are based on physical features and sensitivity levels, and define acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape. Maps and narratives derived from inventories and evaluations of visual resources may be examined in the Beaverhead Forest Supervisor Office.

Outdoor recreation activities include sightseeing, camping, picnicking, fishing, hunting, hiking, backpacking, various winter sports, photography, off-road vehicle use, horseback riding, and the study of natural features and wildlife. Some of these activities, such as camping, picknicking, and off-road vehicle use, occur in areas that contain noxious weeds and poisonous plants. These activities, and the vehicles involved, routinely transport in the noxious weed seeds responsible for the infestations. More detailed recreational information is available at the Forest Supervisor and District Offices.

13. Wilderness and Special Areas

The Beaverhead National Forest includes approximately 72,526 acres of the Anaconda-Pintler Wilderness and over 91,000 acres of the Lee Metcalf Wilderness. An additional 169,200 acres will be proposed for wilderness under the final Forest Land Management Plan. The proposed area includes 55,000 acres in the West Big Hole; 80,000 in the East Pioneers; 26,000 in the Italian Peaks; and the 6,500 North Big Hole and 1,700 acre Storm Peak additions to the Anaconda-Pintler Wilderness.

The Land Management Plan also identifies numerous special areas with healthy native vegetative condition that can be adversely impacted by noxious weeds or poisonous plants is critical. These include administrative sites (96 acres); existing and proposed Research Natural Areas (3801 acres); and special recreation management areas (366,740 acres).

14. Economy

Per capita income for the four-county area is varied. Madison County is much below the State average of $5,691 at $3,936 while Beaverhead, Deer Lodge and Silver Bow Counties are near or above the State average at $5,372, $5,568, and $5,806, respectively. (All figures are based on 1976 data).

Beaverhead and Madison Counties have a much higher percentage (18.4 percent) of persons employed in agriculture than the State average (10.2 percent). This segment of the population will be directly impacted by any change in land productivity, such as noxious weeds.

Travel related employment is very important to all four counties. Madison County is forth highest in the State for percentage of employment in the industry at 10.2 percent. Beaverhead and Silver Bow both range around 8 percent. A large percent of this travel is directly related to Forest related recreation (see recreation for specific information). Any change in resource values that will affect the attraction factor (i.e., wildlife, scenics, fisheries, etc.) will directly impact that segment of the population employed by the travel and recreation industry.

15. Social and Economic Setting

The Beaverhead National Forest is located primarily in Beaverhead and Madison counties, and Forest activites are most likely to affect people living there. Smaller amounts of the Forest are located in Silver Bow and Deer Lodge counties. People living in these counties also use the Forest and are included in this evaluation.

a. Population

The Forest encompasses portions of five Montana counties. Population in Beaverhead, Madison and Gallatin counties has increased in the period between the 1970 and 1980 censuses, while population in Deer Lodge and Silver Bow counties has decreased due to the curtailment of the Anaconda Company mine and smelter operations. Census figures for the year 1980 for the five counties by ethnic group is shown in Table III-1

Table III-1 Local Population and Minories

County	White	Native American	Black, Asian and Other
Beaverhead	8,050	97	39
Madison	5,394	30	24
Silver Bow	37,106	538	448
Deer Lodge	12,170	245	103
Gallatin	42,023	451	391

All five counties have an above-average population of residents over 60 years of age, compared to the remainder of the State.

2. Lifestyles

The local population depends on the Forest for a variety of resources including livestock forage, timber, posts and poles, firewood, recreation (including hunting and fishing), and water for irrigation and domestic use. The Forest generates jobs in the timber, mining and outfitting industries and brings exterior dollars into the community from the tourist trade. For many people, a continued supply of these resources is essential to maintain their current lifestyle.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

A. Introduction

This chapter compares environmental consequences (impacts) of the four alternatives to the existing environment as described in Chapter 3 and analyzes the significant impacts resulting from implementing each alternative. Analysis, including the scoping process, reveals that the proposed program for controlling noxious weeds would not significantly affect climate, geology, topography, minerals, or cultural resources. Therefore, those topics are not discussed. No irreversible or irretrievable commitments of resources would be involved in implementing the proposed program.

Basic assumptions of the analysis in this chapter include the following: (1) that the Beaverhead National Forest will have the funding and personnel to implement the proposed noxious weed control program, (2) that all project design features described in Appendix E will be applied, and (3) that the types and amounts of treatments will be applied as shown in Table I. The program is intended to be in effect for 10 to 15 years.

In this EIS, short-term and long-term are defined as follows:

Short-term is the 10 year period following the initial implementation of the noxious weed control program. Long-term is beyond the 10 year period.

B. Impacts to Soils

Alternative 1 would have negative impacts to native soil, due to the anticipated spread of noxious/undesirable plants, particularly wyethia and knapweed. These plants produce allelopathic chemicals which are toxic to many other plants and soil microflora. These chemicals result in changes in carbon cycling, through reduced plant residue inputs to the soil, which lowers the regenerative and productive capacity of the soil. There also is the potential for soil movement and loss, because pure stands of knapweed often do not provide the level of soil protection that native plants provide. There is the potential for reduced water infiltration and storage capacity in soils under wyethia, because soil structure is degraded and soil pore space is reduced. Unlike most other noxious weeds/undesirable plants, wyethia usually establishes itself only on the better, more productive soils.

Pulling weeds by hand, or grubbing them with hand tools as described in Alternative 2, would have no significant impacts. Mowing weeds would not be expected to have any significant impacts on soil, other than the continuation of inputs of allelopathic chemicals into the soil from knapweed and wyethia. Tillage would cause some soil movement and loss from the site; allelopathic chemicals would still be input into the soil.

The introduction of additional biological agents, including sheep, are not expected to significantly change the situation from the No Action Alternative.

Removal of noxious weeds and undesirable plants by chemical treatment may result in short-term increases in surface erosion that would be mitigated as vegetation reoccupied the treated site. Impacts on soils from herbicide applications would be nonexistent under Alternatives 1, 2, and 3. The behavior of a chemical substances in soils is determined by several properties relating both to the chemical and to the soil environment. The behavior in the soil environment of herbicides proposed for use is summarized in Table 4-1 and discussed below.

Table 4-1. Behavior of herbicides in soils.

Herbicide/ Active Ingredient	Est. percent of total use	Behavior in Soil
2,4-D	58	Persistence is short (less than 1 month). Relatively mobile compared to other herbicides. Microbial activity is the major means of degradation.
Picloram	36	Persistence is moderate to high (1 year or more). Mobility is relatively high since adsorption to soil particles is low. Degradation results from light and microbial action.
Dicamba	6	Persistence is moderate (3 to 12 months). Mobility is high. Degradation mostly from microbial decomposition.

The persistence of 2-4,D has been studied in a variety of soil types and under a wide range of environmental and laboratory conditions. Persistence of 2,4-D in most soils is short and is generally less than 1 month (Ashton, 1982). Norris (1983) found the half-life of 2,4-D in soils to be 1 - 4 weeks with little potential for bioaccumulation. In general, 2,4-D is relatively mobile in soil compared with other herbicides (Ghassemi et al., 1981). Microbial degradation is the major mechanism by which 2,4-D is lost from the soil, especially under warm, moist conditions with high soil organic matter - conditions that stimulate the growth of microorganisms. 2,4-D is not thought to leach into streams (Norris, 1981), because it is adsorbed to soil organic material and rapidly degraded by soil microorganisms. Only minor losses of 2,4-D activity occur due to photodecomposition, and for most formulations, due to volatilization.

The fate of picloram in soil is determined by several factors, including volatilization, photodecomposition, adsorption, leaching, runoff, and chemical and microbial degradation. Volatilization is not considered a major determinant of environmental fate because of the low vapor pressure of picloram. Picloram is degraded by natural sunlight and ultraviolet light, although the extent of photodecomposition under field conditions has not been measured.

Picloram is generally considered to be a mobile herbicide because its adsorption to soil particles is low. The mobility of picloram is less in soils high in organic matter. Preliminary studies with various soil types found that picloram is usually confined to the upper 1 foot of the soil profile when application rates are low (less than 1 pound/acre), but that picloram can readily move to depths greater than 3 feet, even in relatively dry areas, when the application rate is high (3 to 9 pounds/acre) (NRCC, 1974).

The persistence of picloram in soils is considered to be moderate to high because it may exist at phytotoxic levels for a year or more after normal application (Mitchell, 1969, NRCC, 1974). Picloram persistence in soil is related to both treatment rate and climate. The half-life of the compound has been reported to range from more than 4 years in arid regions to 1 month under highly favorable conditions of moisture, temperature, and organic content of the soil (NRCC, 1974). On the other hand, two studies of picloram persistence in arid and semiarid soils suggest that application rates not exceeding 1 pound/acre/year significantly reduce the potential for accumulation in the soil; Scifres et al., (1971) reported that studies on semiarid rangeland in northwest Texas found dissipation of 0.25 pound/acre of picloram from the soil profile within a year and usually within 90 days under warm dry conditions. Residues usually were restricted to the top 12 inches, at least for 60 days. Five ppb or less were detected below 12 inches 120 to 180 days after application. Vore and Alley (1982) reported that studies on different soil types in Wyoming showed the highest concentration of picloram was in the top 8 inches of soil. At applications of 1 pound/acre, concentrations ranged from 0.991 to 0.062 ppm after 117 days. As a comparison, the acceptable picloram tolerance level for forage grasses is 80 ppm(40 CFR 180.29).

Dicamba has a moderate (3 to 12 months) persistence in soil compared to other herbicides (Ashton, 1982). Dicamba does not adsorb readily to soil particles and colloids and thus has a high degree of mobility in most soils. The major route for loss of dicamba in soil appears to be microbial degradation rather than chemical degradation or photodecoposition.

Use of the chemical herbicides as proposed under this alternative would not significantly degrade soil productivity in the long term.

C. Impacts to Waters

Impacts to the water resources will be minor and short-lived due to the wide geographic distribution of treated areas, the small amount of acreage treated, and the use of proven mitigation measures. Alternative 1 (no action) will have no effect on surface water, as will Alternatives 2 & 3 (mechanical and hand grubbing), except for possible slight increase in sediment. There is a low probability for minor effect with the Proposed Action.

Site specific environmental analysis will be conducted before herbicide application projects are conducted. These will identify sensitive areas where herbicides may have an impact and will specify mitigating measures to insure the protection of water quality.

1. Surface Water. Manual and mechanical removal of target plants under Alternatives 2, 3 & 4 will have virtually no effect on surface water. The use of chemicals in the PA could temporarily impact surface water. Most chemicals enter surface water through either direct application or drift of the spray material to the water surface. Research has demonstrated that direct application of spray materials to water surfaces can be minimized by excluding streams within treatment areas (USDA Forest Service, 1980). The land manager has direct control over this activity. Project mitigation features will specify that buffer strips will be maintained, as appropriate, between live water and spraying. Hand application of spray produces little or no drift.

Overland flow of water on forested watersheds is relatively uncommon. Any impacts from overland flow will arise where spray material lands on an area that is capable of transporting water to a stream, such as roadside ditches. Any contamination that does occur will be reduced when the water passes over untreated areas. Herbicide that may enter a stream will be quickly diluted to low concentrations by the relatively large volumes of water.

A strong background of research experience permits prediction with confidence that concentrations of 2,4-D and Picloram exceeding 50 micrograms per litre will seldom be encountered in streams adjacent to carefully controlled forest spray operations (Duseja and Evans, 1973., USDA Forest Service, 1980). Water quality monitoring studies (Galbraith, 1980, USDA Forest Service, 1982 and 1984) of noxious weed control spray programs in the Intermountain Region supports the above conclusion. Levels of herbicides detected in streams were well below any harmful levels for fish and wildlife.

The other major herbicide proposed for use, dicamba show similiar results. Ghassemi and others (1981) reviewed the persistence and fate of dicamba in aquatic systems. Because dicamba salts are highly soluble and quickly enter the soil they are unlikely to remain available for transport via precipitation runoff to nearby waterbodies. Normal Forest Service herbicide operations, using standard controls such as buffer strips, would not effect suspended sediment or water temperature. Any cumulative effects on the larger rivers of spraying in a number of tributary basins would be too insignificant to detect. State water quality standards will always be met.

2. Groundwater: Alternatives 1-3 have no potential for impacting groundwater. The PA has a very insignificant potential for impacting groundwater.

The potential exists for detectable traces of Picloram, 2,4-D and Dicamba to enter groundwater.

Streams and wetlands where water occurs close to the surface are areas where there is often a high concentrations of microorganisms. With proper use of buffer strips, the only spray reaching these areas would be by drift. No impact to the groundwater is expected because the amount of herbicide that might drift is low and the number of microorganisms for degradation is high.

No herbicides applied on National Forest lands have been reported to reach groundwater. Although little information exists, non-Federally applied herbicides of private lands have been reported to reach groundwater (BLM,1985).

D. Impacts to Fish

Alternatives 1, 2 and 3 would have little potential impacts to fish. The herbicides that would be used in Alternative 4 are low in toxicity to fish and would be applied at rates that would minimize potential adverse effects to fish. Alternative 4 would have the most potential impacts to fish.

Spraying water courses would result in the main impact to fisheries. Since no spraying would be done within ten feet of live water, no adverse effects should result to fish.

Dicamba and picloram are only slightly toxic to fish. Concentrated 2,4-D ester formulations are toxic to fish, while salt and acid formulations are only slightly toxic. These chemicals don't bioaccumulate in fish to any great extent. Agriculture Handbook 633 (USDA, 1984) provides an excellent review of the toxicity of these herbicides to fish. Resource publication 137 (USDI,FWS, 1980) also provides data on the toxicity of chemicals to fish.

E. Impacts to Wildlife

Under Alternative 1, forage production for wildlife would decrease if noxious weeds and undesirable plants weren't controlled. Winter range habitat and associated forage production could decline with the establishment of weeds. Wildlife cover values for game birds and small animals would also decline. However, present impact wouldn't be significant because of the scattered nature of the infestations. Alternatives 2 and 3 could have the same effect as Alternative 1 if they don't effectively control the noxious weeds and undesirable vegetation.

Biological control involving sheep could displace big game animals during the time the sheep are in the area and a temporary loss of feed for wildlife would result during the treatment year. The use of insects for biological control would not cause any adverse impacts to wildlife.

Under Alternative 4, there could be a slight impact on wildlife with the loss of target and nontarget vegetation used for food and cover from spraying herbicides. However, in the long-term, forage production would increase after treatment. Cover could slightly decrease. No direct impacts to the animals themselves or to their food chains are anticipated with the use of dicamba, picloram, and 2,4-D. These herbicides have low toxicities and when applied at proper rates with precautionary measures, no direct impacts to wildlife would occur. Agriculture Handbook 633 (USDA, 1984) provides an extensive review of the environmental fate and toxicological literature for these herbicides. This review indicates that these herbicides have little tendency to bioaccumulate in the environment.

F. Impacts to Threatened and Endangered Animals

No adverse impacts are expected to occur on threatened and endangered animals under any of the alternatives. As mentioned under the Wildlife section, no direct impacts on the animals themselves or their food chains would occur with proper application rates and precautionary measures when using herbicides. See

Biological Evaluation of Threatened and Endangered Species in Appendix B of Pesticides to Wildlife.

G. Impacts to Livestock

Impacts to livestock could occur directly from the ingestion of poisonous plants and toxic noxious weeds, indirectly from changes in the current forage supply, and exposure to herbicides. Toxic reactions occur to livestock that ingest poisonous plants and toxic noxious weeds found in the Beaverhead National Forest.

A study of knapweed has shown that infestation can reduce forage production from 891 to 54 pounds per acre in a relatively short period (French and Lacy 1983). Leafy spurge is reported to reduce yields of desirable forage by 50 to 75 percent (Alley et al. 1984).

Chemical treatments are generally applied in a form or at such low rates that they do not affect livestock. Most major treatments under the proposed alternatives would be applied when livestock are not in the treated area, but spot treatments would be applied at any time, regardless of the presence of livestock. Animals consuming forage treated with certain herbicides (picloram, 2,4-D, and dicamba) cannot be slaughtered for food within the period of time specified on the herbicide label.

The use of biological means may require that livestock not be allowed to use a pasture during relatively short periods to avoid adversely impacting the biological agents. When domestic sheep are used to prevent livestock losses to tall larkspur, the sheep may gain less weight than when they are free to select their own diet and are not moved as frequently. The sheep would not eradicate larkspur, but rather reduce cattle losses by reducing the palatability of larkspur to cattle.

Alternative 4 benefits livestock the most by improving rangeland ecological condition over the largest area. This improvement would result in a greater amount of desirable forage being available. The number of plants toxic to livestock would decline. Range managers would have the greatest flexibility to fit the control technique to the situation. Alternative 1 would result in a decline in desirable forage. Poisonous plants and noxious weeds would spread. Overall, Alternatives 2 and 3 would probably result in impacts closer to No Action, Alternative 1, since manual, mechanical and biological methods are less effective and efficient in controlling noxious weeds than are herbicides.

H. Impacts to Vegetation

Terrestrial vegetation is the environmental component that would be most affected by the proposed plant control program. Treatment of noxious weeds and poisonous plants could affect both target and nontarget vegetation.

Alternative 4 would have the greatest effect on target vegetation by providing the most comprehensive control effort. Alternatives 2 and 3 would provide less effective control of target vegetation. Alternative 1 would allow the spread of noxious weeds to accelerate and would not provide adequate cooperative efforts with other landowners and managers within affected areas.

The proposed herbicides are selective, affecting broadleaf plants but not grasses. Appendix **D** provides descriptions of the herbicides proposed for use. Glyphosate is the only nonselective herbicide proposed for use that would affect nontarget species, however, only limited use of glyphosate is expected. Appendix **F** provides an estimation of susceptibility of primary target plants to control by the major herbicides proposed for use. Under chemical techniques, some chemical residue may be left for varying periods, depending on soil and climatic conditions.

Because chemical drift could injure nontarget vegetation, herbicides would not be applied when weather conditions would defeat their effectiveness or when controlling the treatment would be a problem **(Appendix E)**.

The less selective of the herbicides that would be used under Alternative 4 would result in the greatest chance of injury to nontarget vegetation. For dicamba, picloram, 2,4-D, and other selective herbicides, broadleaf plants would be the main nontarget group affected. Effect on nontarget vegetation would mainly occur with boom sprayer applications (ground vehicle) which makes up a small part of total herbicide treatments.

The extent of any nontarget vegetation injury would depend on closeness of desirable species to treated weeds, method and rate of herbicide application, formulation of the herbicide, and herbicide used. Because herbicides will be more carefully applied in water-influenced areas, injury to nontarget plants would be minimized.

The most effective and efficient control of target plants would be provided by Alternative 4. Implementing this alternative would improve ecological condition by reducing or eliminating competition from weed species and reduce the risk of weed spread to downstream agriculture.

Alternative 1 would allow target plants to spread unchecked and contribute to a decline in ecological condition. Poisonous plants would not be treated even if they are a problem. Noxious weeds would increase, resulting in reduced forage production and degraded habitat for both livestock and some wildlife species. Weeds would spread to uninfested private land, resulting in a decline in agricultural productivity and increased economic burden on landowners.

Alternative 2 would most likely result in impacts similar to those of Alternative 1 because manual methods are much less efficient than herbicides in controlling some target plants. Alternative 3 would provide somewhat better control than Alternative 2 because biological control agents would be maintained and new species introduced as they became available. Alternative 3 would not provide the immediate control desired to reverse the increasing trend of noxious weed establishment due to the limited nature of biological control. The ability of biological agents to effectively control noxious weeds varies widely because many agents only reduce the viable seed without destroying the established plant.

I. Impacts on Threatened, Endangered, and Sensitive Species

The Endangered Species Act of 1973, as amended, requires that all Federal agencies seek to conserve threatened and endangered species and that they consult with the Secretary of the Interior to ensure that any actions they take are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of designated critical habitat.

The Nature Conservancy (J. Bird, 3/10/86 letter) expresses concern that allelopathic effects of knapweed can threaten the existence of plants of special interest. Alternatives 1-3 would not adequately control noxious weeds, so this impact could occur. Alternative 4 will not adversely impact these plants, providing these plants are not treated with herbicides. As described in Chapter 3, no known threatened or endangered plant species are known to occur on the Forest, however, field inventories of site specific projects may reveal their existence. Pretreatment inventories of all projects will evaluate vegetative communites for the presence or absence of threatened, endangered or sensitive species much the same as if known species occurred on the Forest. The size of most treatment sites and the total acreage of annual treatment is small (less than one percent) relative to the total acreage of the Beaverhead National Forest; therefore, a low probability exists for any adverse impacts to threatened, endangered or sensitive plant species.

Mitigation steps have been proposed that should increase the certainty that there will be no impacts to threatened or endangered species. These steps include the following:

1. Before any noxious weed control efforts are undertaken, qualified personnel will delineate areas where plant species of special concern are found or are likely to be found. No herbicides will be used in areas where an impact on Federally designated threatened or endangered species is likely to occur, and care will be taken to avoid plants of special concern.

2. In cases where control must be undertaken in known or suspected threatened or endangered species habitat, qualified personnel will conduct a site-specific assessment of the presence and distribution of the species and recommend the use of a control technique that would not adversely affect the species.

3. No control action will be undertaken if there is a reasonable likelihood that of a threatened or endangered species will be adversely affected by the control effort.

Unidentified populations of threatened and endangered plants could be susceptible to any impacts described for terrestrial vegetation. Direct effects of injury or death to plants could immediately eliminate a species in all or a significant portion of its range. The more subtle effects of vegetation community changes could eventually eliminate a species on a specific site locally through the loss of the ability to compete with other vegetation.

It is unlikely that threatened or endangered plants will be affected by manual control techniques. They could, however, be affected by the use of herbicidal methods. Site-specific analysis will determine whether any threatened and endangered plants are in the vicinity of a planned noxious weed or poisonous plant control operation and address the potential impact of control activities on those species. The analysis will also determine any necessary mitigation measures to protect those species.

Upon determination that a threatened or endangered species may be present in the area of a proposed noxious weed control project, the responsible district must carry out a biological assessment to identify how the listed species might be affected. The Forest Service will cooperate in the development of any necessary biological assessments and will consult (both formally and informally, as necessary) with the Fish and Wildlife Service.

J. Impacts to Timber

Alternative 1 will result in significant increases in noxious weed density and occurrence along roads, and in some harvested areas. Spotted knapweed and some other plants produce chemical compounds that inhibit growth of other plants. Although no iformation is available to confirm that these growth inhibitors have significant adverse impacts on tree regeneration, the impact is assumed to occur.

Alternative 2 will result in increases in noxious weed density and occurrence along roads, and in some harvested areas. Tree roots and regeneration will be disturbed or destroyed in areas if mechanical control is accomplished too close to trees. Probability of impact on regeneration from growth inhibitors will increase.

Alternative 3 will result in slightly less increase in noxious weed, but impacts will be quite similar to Alternative 2. There is a very slight chance that one of the introduced biological control organisms could adversely impact desirable tree growth, although research conducted prior to organism release should ensure that this would not happen.

Alternative 4 will result in control of noxious weeds over time. Chemicals used to control weeds can be toxic to trees unless carefully applied in vicinity of trees, depending upon time of treatment, tree species and chemical concentration. Mechanical treatment and biological control would have the same impacts as described in Alternative 3.

K. Impacts on Recreation

Mechanical treatment will create visible disturbance if used under alternatives that allow mechanical treatment (Alternatives 2-4). Herbicide application under Alternative 4 may cause short-term color contrasts between treated and untreated areas. Herbicide application can also cause short-term changes in vegetative diversity within treated areas. These short-term impacts will normally be off-set by long-term maintenance of native vegetation.

Alternative 1 will adversely affect recreation use as areas become more densely infested with noxious weeds. In addition to visual effects, and loss of native vegetation, physical discomfort will develop from stickers from thistles, burs from houndstongue, and the irritant latex of leafy spurge. Similar impacts will gradually occur as noxious weed infestations escape control efforts under Alternatives 2 and 3. In addition, closure of areas to public use following high cost treatment to prevent reinfestation by noxious weed seeds carried in by recreation vehicles will also adversely impact recreation.

Alternative 4 will provide economical and effective means of controlling noxious weeds in involved recreation areas, and avoid the impacts shown above. Although analysis indicates that no significant, identifiable health risk is involved, introduction of herbicides into areas with concentrated public use will cause concern for those opposed to herbicide application. When herbicides are used in such areas, reasonable effort will be taken to advise visitors of such use and involved risk so that the visitors can decide whether to continue to use the area or to move to untreated areas.

L. Impacts to Wilderness and Special Areas

Isolated infestations of noxious weeds occur around current and proposed wilderness areas, primarily at transfer camps, the ends of roads, and lower trail areas. A few of these infestations extend along trails into designated wilderness at this time. Noxious weeds can be controlled using manual treatment and herbicides when they threaten lands outside wilderness or are spreading within the wilderness, providing control can be affected without serious adverse impacts on wilderness values (Forest Service Manual 2323.24B, 2(b)).

Alternative 1 will allow noxious weeds to continue to spread into and around wilderness areas, at the expense of native vegetation.

Alternative 2 will allow manual control, although efforts will be especially costly because of limited access. Weeds are anticipated to continue to spread at the rate of up to 16% per year, and the impacts of these non-native plants will become significant over time.

Alternative 3 will allow manual control plus the introduction of biological control organisms. Most of the biological control agents will be non-native, as will be the noxious weeds they utilize. Over time, the weeds are anticipated to spread and impact native vegetation and the dependant native wildlife population.

Alternative 4 appears capable of containing known infestations, and stopping the spread into wilderness areas. Known infestations are small and isolated at this time. Effective control appears possible with inclusion of the use of herbicides. Regional office approval is required for use of herbicides within wilderness.

Impacts on special areas will be identical to those on wilderness. Some of the special areas, such as the special recreation areas, currently have significant occurrence of noxious weeds, especially along roads and trails.

Site specific analysis for individual projects will identify special considerations that will be utilized to avoid adverse impacts on wilderness or special area values.

M. Impact on Economic Conditions

This analysis considers the effects of the alternatives on livestock, the effects of target plant control activities, and the spread of noxious weeds on the area economy. Economic impacts are presented for each alternative on the basis of changes in weed control activities, and the related impact on rangeland values.

Under Alternative 1, increasing reduction in rangeland values will occur as noxious weeds continue to spread. Based on studies from MSU (Bucher, 1984), approximately 56% of the Forest's rangeland will have a 63% reduction in suitable forage. This change in vegetative condition will result in long-term loss of 35% of current livestock AUM's, or a reduction from the current 190,000 AUM's to 123,500. A similar loss will occur on wildlife ranges. Assuming that this loss will be most significant on winter ranges, the loss of forage will have serious impacts on wildlife populations. A ready seed source will be provided for infestations on range and agricultural lands in other ownerships. No direct cost will be incurred by the Forest Service in control activities.

Under Alternative 2, local economic activity will benefit primarily by the high cost of the control effort. In general, infestations on the Beaverhead occur along road and trail rights-of-way and timber harvest areas. Many of the infestations occur along primitive "4-wheel drive" routes and trails. Rocky ground, steep slopes and difficult access is common. Terrain and small, isolated infestations make hand grubbing or pulling more practical and cost effective than using mechanical equipment in most instances. The high costs of labor and equipment for initial and followup treatment will benefit local contractors. Manual treatment will be very time consuming and costly. Budget projections indicate that less than 10% of the infested area could be treated in any one year. High cost of control will necessitate imposing some restrictions on use to help protect the investment. For example, if a treated infestation is located along a 4-wheel drive vehicle track, and the original seed source appears to have been the undercarrage of vehicles, the track will be closed to vehicles. Over time, weeds are anticipated to escape the control effort and impacts will be similar to Alternative 1.

Impacts under Alternative 3 will be very similar to Alternative 2, with the added cost of collecting and spreading biological agents. The biological agents will be most effective in heavy infestations on better sites. Current status of biological control agents are such that they do not provide an adequate control alternative at this time (C.A. Lacey, pers. comm.). As research continues, biological control agents are anticipated to become more numerous and effective. Biological control techniques appear to represent the most effective, economic and environmentally sound long-term method for controlling weeds, providing adequate effective agents can be located and become established in areas of concern.

Under Alternative 4, effective long term noxious weed control objectives, as include in the Beaverhead National Forest Land Management Plan, should be achieved. New problem weed infestations should be located and treated as they occur. Existing noxious weed and poisonous plant infestations can be contained, and gradually will be controlled to the point that they do not present serious problems. Manual treatment will be used in sensitive areas where chemical treatment might have undesirable impacts (i.e., areas directly associated with open water). Although labor intensive, the infected acres requiring such treatment are quite small at this time. Biological treatment will be applied where practical. Most effective treatment involves using sheep to graze scattered larkspur ahead of cattle. Introduction of biological agents such as insects and diseases for specific weeds will continue as they are identified and certified as safe to use by research. Minor concern remains that biological agents will adapt locally to impacting desirable vegetation as well as the target weed species. Chemical control using approved herbicides will occur following label instructions and additional constraints to ensure safe application. When a specific source can be identified as providing the seed source for reinfestation of treated areas, the treated areas may be closed to that use (i.e., livestock trailing or off-road vehicle use).

Approximate total annual costs of alternative implementation are estimated as follows, using 1985 dollars:

Alternative 1: $0

Alternative 2: Assume essentially all work will be by manual means at $235 per acre with 10% of the infested acres treated each year equals $180,644.

Alternative 3: Costs will be slightly higher than for Alternative 2 due to transportation and wages involved in collecting and releasing agents involved. These costs will be relatively insignificant. Annual costs are estimated at $180,700.

Alternative 4: Costs analyzed for the Beaverhead National Forest Land Management Plan estimate need for $75,000 per year until effective control can be achieved (approximately 10 years) then cost of the program could be reduced significantly. This analysis assumed that each known infestation could be treated a minimum of one time annually, but did not include the cost of completing formal Environmental Impact Statements each year. (Estimated cost $6,000).

TABLE 4-2. INDIVIDUAL TREATMENT COSTS PER ACRE IN 1985 DOLLARS

CHEMICAL	GROUND RIG WITH BOOM	HAND
Picloram Dry	Not Anticipated	$134
2,4-D	$28	$50
2,4-D/Dicamba	$26	$51
2,4-D/Picloram	$39	$61
Manual	N/A	$235
Biological	Not Applicable	$85

Estimates are based on R-4 study-costs appear directly applicable to Beaverhead N.F. Chemical costs may be slightly higher because of added transportation, but the difference does not appear significant.

TABLE 4-3. ESTIMATED ACRES TREATED, FORAGE INCREASES, AND ACRES UNTREATED

	Alt. 1	Alt. 2	Alt. 3	Alt.4
Acres of treatment 1/	0	769	769+	7687
Untreated acres	7687	6918	6918-	0
Acres of infestation in 10 years 2/	77,528	34,200	34,200-	2190
AUMs lost after 10 years 3/	25,843	11,400	11,400-	730
Estimated annual control costs ($)	0	$180,644	$180,700	$75,000

1/ Assumes that funding/manpower limitation will allow only 10% area treatment annually under Alternative 2, slightly more with introduction of biological control in Alternative 3, and that all known infestations will be treated at least once annually under Alternative 4.

2/ Assumes annual increase of 26% with no treatment (personal conversation with C. A. Lacy, Weed Control Coordinator, Montana Department of Agriculture), 10% effective control with 16% spread under Alternatives 2 and 3, and 30% annual decrease under Alternative 4.

3/ Assumes 3 acres per AUM (AUM=Animal Unit Month or 780 pounds of usable forage for all classes of herbivores).

N. Impacts on the Social Environment

Forest Service noxious weed and poisonous plant control programs will directly and indirectly affect social conditions and attitudes.

Direct impacts relate to the degree to which the Forest Service effort is or is not complimentary to local efforts in meeting intent of State weed laws and local control objectives. Direct affects of such action, or lack thereof, will have significant impacts on vegetative management on the Forest and surrounding areas. Local interests concerned about rangeland values and the related livestock/recreation industries generally are very concerned about ensuring that all agencies and individuals with land management responsibilities take appropriate and coordinated weed control action. Although no local concern has been expressed about herbicide use, providing label instructions and other reasonable precautions are taken, some individuals have a degree of reservation concerning the long-term impact of chemical application.

Indirect impacts result from economic outcome of Forest Service policies and in response to gains or losses of recreational or work access. Social effects include people's reactions to changes in the availability of different kinds of jobs and the communities' dependance on these jobs.

Agricultural and recreation related activities produce a major part of local income and community stability. Since the area involved is rural, with small towns and scattered ranches and farms, any action that affects the stability of agriculture or recreation will have significant impacts on local economies and the related social environment

Specific social impacts are difficult to estimate, except by projecting anticipated impacts on the involved rangeland resource and trying to interpret what this impact will mean.

Alternative 1 will have substantial long-term impacts. Bucher (MSU, 1984) estimates that 56% of the involved rangeland will become infested with spotted knapweed, with an average forage reduction of 63%. Assuming that just this one weed was allowed to run its natural course on the Beaverhead National Forest, current livestock production will be reduced by an estimated 67,000 AUM's (56% of suitable rangeland infested times 63% forage reduction times current 190,000 AUM's). The Forest Land Management Plan projects value of an AUM as $8.53, so direct loss to the livestock industry is projected as $571,510 annually. Impacts on wildlife is much more difficult to assess. Some direct overlap will occur on the livestock range in above calculations. However, the most significant loss will occur on key winter ranges. Carrying capacity for wintering wildlife will be reduced by 35% (56% of suitable rangeland infested times 63% forage reduction). Impact on the wildlife related recreation industry and the local lifestyle that includes hunting will be significant. The seriousness of implications becomes more obvious with the realization that this projection involves just one weed, spotted knapweed, and other weeds involved will have additional impacts.

Primary social advantage of Alternatives 2 and 3 involve the labor-intensive effort involved. Effective control on the involved 7687 acres at the estimated $235 cost per acre will require a one time cost of over $1,800,000 plus annual inspection and follow-up action. Practicality of obtaining the one time cost and administering a program of this magnitude must be questioned on the basis of projected cost effectiveness and budget projections alone. A more realistic approach involving treating 10% of the infected areas each year which requires $180,000. Local labor forces will benefit from expenditure of these funds. However, noxious weeds are projected as increasing by 26% annually. If only 10% of the area is treated, a net loss of 16% will continue until impacts approach those shown for Alternative 1. This trend could be reduced for Alternative 3, especially as more effective biological agents are developed. Significant controls on vehicle use, livestock trailing and other activities that contribute to the spread of noxious weeds will be required to protect investments.

Alternative 4 appears to represent an effective program within realistic budget projections. Involved funds will be expended locally, which will directly impact the economy. Containment and reduction of noxious weed infestations will reduce current impacts on forage production and the related rangeland values. Concern about the safe use and related risks involving use of herbicides will be introduced. Some restriction in activities such as off-road vehicle travel, livestock trailing, use of weed free hay and other activities that affect the spread of noxious weeds can be anticipated.

O. Impact on Human Health

Potential for injury or accident to workers exist with any activity carried out for noxious weed and poisonous plant control. Hazard exists to equipment operators, and crews using pack and saddle stock, walking or using hand tools. Steep, rocky terrain is frequently involved, increasing the opportunity for falls. Labor intensive methods, such as hand pulling and grubbing frequently cause blisters, sprains, and strains. Hand pulling exposes workers to hazards of physical contact with irritant weeds that cause blisters, inflammation and dermatitis (for example leafy spurgue or common tansy). Sensitive individuals can react severely to pollen from some species, and the close contact of hand pulling or grubbing could cause discomfort of health risk. A hazard of hand pulling is the potential for serious poisonous snake bite. These hazards exist under Alternatives 2-4.

Under Alternative 4, the public and workers, could be directly affected through their intake of food or water exposed to herbicides. Chemicals from herbicides may also be taken directly into the body orally, dermally, or through inhilation. Although precautionary procedures are used to see that contact with humans is kept to a minimum, some hazard of exposure still exists. People most likely to be exposed are those involved in application.

Primary impacts on human health from herbicide treatment depend upon toxicity of the herbicide and the level and duration of human exposure. All chemical effects on biological systems follow a dose-response relationship; as dose increases so does effect, and vice versa. The herbicides of concern in this EIS have not been found to cause statistically significant mutagenic or carcinogenic effects when used as prescribed. A No Observed Effect Level (NOEL) dose can be established as the highest dose that causes no toxicologic change in exposed animals.

Herbicide exposure may be brief (acute) or prolonged (chronic). The terms acute and chronic may be used to describe duration of effect as well as duration of exposure. The kind of response (acute or chronic) observed in organisms depends on the route of intake (oral, dermal, inhalation) and frequency of exposure, coupled with the specific mechanisms of toxicity. A chemical of high toxicity may represent no or limited hazard if exposure and dose are low or brief, just as a chemical of limited toxicity may be hazardous if exposure is high or prolonged.

Extensive studies of the absorption, distribution, metabolism, and excreation of herbicides in animals (U.S. Dept. of Energy, BPA 1983) have shown that the herbicides of concern in this document and their metabolites are rapidly eliminated from most animals and do not substantially accumulate in animal tissues. These traits further reduce the possibility that exposure will result in harmful consequences.

The National Environmental Policy Act states that "When an agency is evaluating significant adverse effects on the human environment in an EIS and there are gaps in relevant information or scientific undertainty, the agency shall always make clear that such information is lacking or that uncertainty exists." NEPA regulation further states "If the agency proceeds (in the face of uncertainty) it shall include a worst-case analysis...." The courts have concluded that scientific uncertainty exists about 2,4-D's carcinogenic effect. The disagreement among experts about picloram's carcinogenic effect is also essentially the same as that surrounding 2,4-D. Resolution of the scientific uncertainty surrounding the carcinogenicity of 2,4-D and Picloram, by obtaining additional information to resolve that dispute is desirable. The Beaverhead has chosen to prepare a worst case analysis before proceeding with the use of 2,4-D, Picloram, and Dicamba, the herbicides included in Alternative 4.

Additional discussion of herbicides proposed for use are provided in Appendix **D**, Herbicide Background Statements; Appendix **K**, Human Health Risk Analysis; and in Appendix **L**, Analysis of Human Health Risks of USDA Forest Service Use of Herbicides to Control Noxious Weeds in the Northern Region. Results of this analysis show there are no adverse effects to the human population when the subject herbicides are applied as recommended and at the levels indicated in the worst-case scenarios.

As presented in these analyses, the worst-case doses to the general population generally have very high margins of safety. With but two exceptions, the worst-case dose levels that could possibly be expected under any conditions to members of the general population are all below the Acceptable Daily Intake (ADI) values set by the EPA for these herbicides. Acceptable Daily Intake values are set on a presumption of lifetime exposures and most exposures associated with noxious weed spraying will be quite transient.

The exposure pathways that could result in the highest dose to the general population (i.e., consumption of sprayed wild food and close range spraying of an adolescent), are both very low probability events. Worst-case worker doses typically have much lower margins of safety, reflecting their more intimate contact with the herbicides. A significant question is whether these margins of safety are sufficient to protect worker health and safety. In determining ADI's for lifetime exposures, EPA typically uses margins of safety of 100 which is the product of a tenfold factor to account for interspecies differences and a tenfold factor to account for effects on sensitive members of the human population. As reviewed in this document, worst-case worker doses have margins of safety of 21 for 2,4-D, 20 for picloram, and 3 for dicamba when compared to the NOEL for any effects for the most sensitive animal species tested. The margins of safety for teratogenic or fetotoxic effects (i.e., effects on fetuses) are 1,429 for picloram, 45 for 2,4-D, and 8 for dicamba.

Several conclusions can be drawn from these findings. First it should be emphasized that women of child-bearing age should be extremely careful when working directly with 2,4-D/dicamba. Restrictions on the use of female applications may be advisable. Secondly, all workers must be advised explicitly of the hazards of these chemicals and instructed in the careful herbicide application techniques so as to reduce dose levels below worst-case values assumed here. Several studies have shown that work practices greatly effect worker exposure and dose.

The toxic effects causing adverse effects in test organisms at the lowest dose levels of these herbicides generally involve changes in liver and/or kidney functions. These effects are closely related to the duration of dosing. For example, no effects were noted at 7 weeks in rats fed dicamba at the highest levels tested (50 mg/kg). At 13 weeks, rats showed histological changes in the liver at 40 mg/kg but not at 25 mg/kg. By contrast, the no-effect level for a 2-year feeding study is 1 mg/kg. It can be concluded that by limiting the duration of worker dose, effects on liver or kidneys can be avoided. Based on worst-case assumptions of this analysis, no individual worker would apply 2,4-D/dicamba mixtures for more than 10 days on Forest System land.

It is not possible to offer assurances that the teratogenic effects of a herbicide exposure level can be avoided by reducing the length of time of herbicide exposure. It has been shown that many teratogens operate during relatively short time frames or critical periods in pregnancy. These periods often occur in the early stages of pregnancy, often before pregnancy is confirmed. Thus, it is not the absolute length of exposure that is relevant, but its timing relative to the critical period. Therefore, because of the low teratogenicity margins of safety for workers spraying dicamba, restrictions on the use of women as herbicide applicators are advisable.

The estimated lifetime cancer risks to workers or individuals in the general population are all less than one chance in a million. The calculation of the probability of cancer is based on a cancer model that overestimates risks, and these risks are below that associated with natural background radiation that people encounter on a daily basis. This level of cancer has also been accepted by other Federal agencies such as FDA and EPA.

CHAPTER 5 LIST OF PREPARERS

Pete Bengeyfield	Forest Hydrologist, Forest Supervisor's Office.
Bill Johns	Forest Pesticide Coordinator and Forest Silviculturalist Forest Supervisor's Office.
Ceci McNicoll	ID Team Leader, Range & Minerals Technician, Wisdom Ranger District.
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Mike Rath	Forest Wildlife Biologist, Forest Supervisor's Office
Earl Sutton	Timber Planner, Forest Supervisor's Office
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CONSULTATION WITH OTHERS

Henry Greitl, Beaverhead County Weed Board Supervisor

Celestine Lacey, Weed Coordinator, Montana Department Agriculture, Helena

John Lacey, Extension Range Specialist, Montana State University, Bozeman

Jack Taylor, Range Management Professor, Montana State University, Bozeman

Neil Peterson, Madison County Weed Board Supervisor

Charles Hahnkamp and Maynard Smith, East Pioneer Experimental Stewardship Program Steering Group.

John Maki, Beaverhead County Cooperative Extension Service, Dillon

CHAPTER SIX: CONSULTATION WITH PUBLIC

This section discusses efforts to involve and consult with a variety of publics during the formulation of the Draft and Final Weed Control Program Environmental Impact Statements.

The first part of this chapter,CONSULTATION WITH OTHERS FROM THE DRAFT TO THE FINAL EIS, summarizes the public involvement effort undertaken, and summarizes the number and types of responses received during the issues identification process.

The second part, AGENCY AND ELECTED OFFICIAL COMMENTS AND FOREST SERVICE RESPONSE, reproduces the comments received from other agencies, local and state government, and elected officials, along with the Forest Service response to each comment. All other comments, along with the Forest Service response to each, have also been included in this section.

The last part of this chapter, LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT, lists all those to whom copies of this document have been sent.

CONSULTATION WITH OTHERS FROM THE DRAFT TO THE FINAL ENVIRONMENTAL IMPACT STATEMENT

The notice of intent to prepare a Weed Control Environmental Impact Statement was published in the Federal Register on December 4, 1985. The Draft EIS was transmitted to the Environmental Protection Agency (EPA) and made available to the public on March 18, 1986. A Notice of Availability was published in the Federal Register on March 28, 1986. News releases for the local papers were sent out announcing both the intent to prepare an EIS, and of its availability. The public comment period on the DEIS ended May 12, 1986.

A total of twenty-four responses were received during the pre-DEIS issue identification process. Most of these were the result of solicitation through either the 'notices of intent' that were published in the Federal Register; the newspaper notices; or by one or more of two 'letters requesting public input' that were mailed in late December, 1985, and early January, 1986, to approximately three-hundred potentially interested people, organizations, and local, State, and Federal agencies, selected from the public mailing lists in the Forest Supervisor's Office. The following is a synopsis of the comments received, followed by the Forest Service reply.

CONCERN: Almost all commenters identified a concern over noxious weed infestatons of crop, range, or forestland, or wilderness, and stressed an aggressive control program be implemented.

REPLY: Both the Draft and Final recognize noxious weed infestation and the need for some kind of action, as addressed in the Statement of Purpose and Need, and in the Major Issues.

CONCERN: Several commenters recognized that man's uses of the land, such as grazing, timber harvest, and mining, are major vectors of weed infestation.

REPLY: Both the Draft and Final recognize the effects of soil disturbance and the establishment and spread of noxious weeds. This is addressed as a Major Issue.

CONCERN: Several commenters suggested preventative measures, such as requiring certified weed-free hay when using pack animals, minimizing road construction and maintenance, education of personnel and Forest users, and washing logging and mining equipment and recrational vehicles that come into the area from weed infested areas.

REPLY: The Forest is studying the feasibility of implementing these and other preventative measures, as discussed in Chapter 2, Alternatives. The training of Forest personnel to recognize and report occurrences of noxious weeds, and to take appropriate action, will be implemented. A policy of using only feed pellets, rather than hay, for pack stock in the Lee Metcalf Wilderness, will be phased in.

CONCERN: Several commentors related the economic impacts of weed infestations.

REPLY: Both the Draft and the Final treat this concern as a Major Issue.

CONCERN: A few commenters recognized the coordination needed between other land holders and the various governmental bodies.

REPLY: Both the Draft and the Final recognize this as a Major Issue.

CONCERN: One commenter recognized the potential human health effects of herbicides.

REPLY: Both the Draft and the Final recognize public health as a Major Issue.

CONCERN: Almost all commenters recognized potential impacts on one or more of thefollowing resources: economic crops; livestock; threatened, endangered,or rare species; native plants and plant communities; desireable range condition; soil quality; fish; wildlife; surface and ground water; and the costs of weed control implementation and monitoring.

REPLY: The Draft and Final both recognize all these concerns as Major Issues.

All Major Issues addressed in this analysis have been evaluated, by alternative, in Chapter 2, E, Comparison of Alternatives, and in Chapter 4, Environmental Consequences.

AGENCY AND ELECTED OFFICIAL COMMENTS AND FOREST SERVICE RESPONSE
(Original letters are reproduced following this section)

This section lists concerns submitted by other Federal Agencies and Elected Officials, and the Forest Service Reply. Included are comments and Forest Service replies to organizations and individuals.

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

1. CONCERN: DEIS did not included need to adopt some form of livestock grazing system to improve vegetative condition and reduce invasion/establishment of noxious weeds.

   REPLY: The Beaverhead National Forest Land Management Plan identifies that over 70% of the Forest's allotments are under improved management systems and places high priority on getting improved management on the remainder. Objective was not included here because it is included as an overall Forest objective.

2. CONCERN: Alternatives could recognize minimizing road construction and maintenance, revegetation of roadsides and unused roads, and preventing introduction/reintroduction of undesirable species by requiring certified weed free hay.

   REPLY: The Forest is currently investigating means for accomplishing all of these points. Those relating to soil disturbing activities are also significant soil and water concerns. The weed-free hay issue is being investigated throughout the State by many concerned agencies. Major problems involve who will certify, availability and enforcement capability.

CLYDE ERIKSEN

1. CONCERN: Personnel applying herbicides must be trained and knowledgable.

   REPLY: All applications will follow lable directions, follow constraints identified in this EIS and site-specific Environmental Analysis, and will be under the direct supervision of a certified applicator.

2. CONCERN: Need to address that poor land use practices often promote the spread of noxious weeds.

   REPLY: This fact is recognized, and is either specifically spelled out in this EIS, or in the Beaverhead Land Management Plan that directs all management activities on the Forest.

THE NATURE CONSERVANCY

1. CONCERN: Livestock grazing and movement may increase occurrence of noxious weeds.

REPLY: Livestock may carry noxious weed seeds although it is difficult to identify any specific infestations on the Beaverhead that originated from this source. Heavy trailing can cause soil disturbance that promotes weed establishment, as addressed in the EIS. Improved grazing management systems designed to improve native vegetation is a specific objective of the Forest's Land Management Plan.

2. CONCERN: Herbicides involved are not species specific, and may adversely impact non-target plants, with special concern for threatened, endangered and sensitive species.

REPLY: As indicated in the EIS, crews working in areas where these plants may occur will be specifically trained in identification of plants of special concern. Because of the scattered nature of most noxious weed infestations on the Forest, individual plants will generally be hand treated which significantly reduces the impact on not-target species. A minor acreage with heavy (over 50% crown cover) noxious weed infestation will be treated using a vehicle-mounted boom, which will cause very localized impacts on non-target species of broadleaf plants.

3. CONCERN: Controlled burning may be a viable alternative in some instances.

REPLY: Controlled burning was not addressed as a viable alternative because of the scattered nature of most infestation, effectiveness, and control problems.

MONTANA WILDERNESS ASSOCIATION

1. CONCERN: Keep noxious weeds out of wilderness areas.

REPLY: Current inventories have not identified current infestations within wilderness boundaries. If found, infestations will be treated either manually or, if necessary, using herbicides. Emphasis will be placed on treating infestations at entry points. The option of requiring weed-free feed in wilderness is being investigated by many agencies State-wide. it is considered a probable future requirement.

2. SUGGESTION FOR INCLUSION: All suggestions appear to have been included except:

A. Train all personnel to identify noxious weeds to aid in inventory and manual control.

RESPONSE: Although an effort is being made to accomplish this task, it was not included in the draft EIS. This is an excellent suggestion, and has been added in the final.

B. Cost of weed control should be included in timber sales, oil leases and exploration, mining activities, and other disturbance.

RESPONSE: These collections are being included in current contracts, leases and operating plans, subject to some legal limitations.

C. Use a wick applicator for herbicide application in riparian areas.

RESPONSE: Current plans are to treat infestations within 10 feet of water manually. Use of a wick appears quite feasible and will be considered as a future alternative if manual treatment does not gain needed control.

SKYLINE SPORTSMEN'S ASSOCIATION, INC.

1. CONCERN: Tordon (Picloram) can damage beneficial broadleaf plants and fisheries if used improperly.

RESPONSE: Analysis indicates low probability of the low concentrations of herbicides reaching water and rapid dilution for the small amounts that might do so under the scattered nature of weeds to be treated. However, this EIS requires the special precaution on allowing only manual treatment within 10 feet of live water. Individual plant application using hand treatment will help reduce impacts on non-target plants.

MONTANA STATE HISTORICAL PRESERVATION COUNCIL (DAVID SCHWAB)

1. CONCERN: All land disturbing actions which result from noxious weed treatment should be preceded by cultural resource review.

REPLY: Included as coordination need in evaluation of mechanical and manual treatment alternatives.

U.S. DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE (WAYNE BREWSTER)

CONCERN: Concur with 'no effect' determination, but if site evaluations show that noxious weed control may affect listed species, consultation with this office is requested.

REPLY: Consultation will be initiated if it is found, during the course of the program or during inventory, that listed species may be impacted.

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE (GLEN LOOMIS)

CONCERN: None; the DEIS represents a thorough discussion of the program.

REPLY: No reply necessary.

RICK TORRE

CONCERN: Adverse impacts of noxious weeds vs. chemical treatment should be adequately discussed, and data relative to herbicides and public health should be discussed; litigation in Forest Service Region Six and insurance liability problems of Montana Counties should be discussed.

REPLY: The adverse impacts of both noxious weeds and treatment has been addressed through issue identification, with input from private citizens, organizations, and governmental agencies; and by assessment of impacts for each alternative, developed from the issues (see Chapter 1, E, Public Participation and Issues; Chapter 2, Alternatives; Chapter 4, Environmental Consequences; and the various appendices, which discuss biological control, herbicide background statements, and human health risk analyses). Litigation in Region 6 concerning dissimilar programs is beyond the scope of this analysis; The insurance liability problem of Montana Counties is not limited to herbicides, but to all programs in general, and is also outside the scope of this analysis.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Endangered Species, Field Office
Federal Bldg., U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:

M.19 Beaverhead NF

May 13, 1986

Mr. Ronald C. Prichard
Forest Supervisor
Beaverhead National Forest
610 North Montana
Dillon, MT 59725

Dear Mr. Prichard:

We have reviewed the Beaverhead National Forest Draft EIS on treatment of noxious weeds and your biological evaluation on the actions potential to impact listed species.

Based upon your commitments to do site specific evaluations for listed species and other precautions to avoid impacts to listed species, we concur with your "no effect" determination. If site evaluations show that noxious weed control may affect listed species, we request that you initiate consultation with this office.

If we can be of further assistance, please contact us again. Thank you for your efforts to conserve listed species.

Sincerely,

Wayne G Brewster

Wayne G. Brewster
Field Supervisor
Endangered Species

cc: ES, Billings, MT

	SUPERVISOR		ENGINEERING SO
	PLANNING SO		GENERAL
	TMBR PLANNING		PRECONSTR
✓	RANGE/WLDF SO		CONSTRUCTION
	HYDROLOGY		TRANS PLANNING
	WILDLIFE		ADMIN SO
	GEO/MINING		PERSONNEL
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	SILVICULTURE		SUPPORT SVCS
	TMBR/SALES FIRE	✓	INFO [illegible]
	LNDSCP/ARCH REC	✓	RESOURCES
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	OTHERS:		

United States
Department of
Agriculture

Soil
Conservation
Service

Federal Building, Room 443
10 East Babcock Street
Bozeman, MT 59715

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BEAVERHEAD N.F.
DILLON, MT

April 7, 1986

Ronald C. Prichard
Forest Supervisor
Beaverhead National Forest
P.O. Box 1528
Dillon, MT 59725

Dear Mr. Prichard:

Appropriate SCS staff have reviewed the "Draft Environmental Impact Statement for Noxious Weeds and Poisonous Plant Control Program". No technical comments were made as a result of the review. In our opinion, the EIS represents a thorough discussion of the program.

Thank you for the opportunity to review and comment on this draft EIS.

Sincerely,

Glen H. Loomis

Glen H. Loomis
State Conservationist

cc:
James B. Newman, Director, Ecological Sciences Division, SCS, Washington, DC
Robert G. Lohmiller, State Resource Conservationist, SCS, Bozeman, MT

✓	SUPERVISOR		ENGINEERING SO
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	OTHERS:		

Montana Department
of
Fish, Wildlife & Parks

Research Bureau
Box 5, MSU Campus
Bozeman, MT 59717

March 11, 1986

Dan Pence, Range Staff Officer
Beaverhead National Forest
P.O. Box 1258
Dillon, MT 59725

Dear Dan:

Ron Prichard's request for comments on preliminary issues and alternatives of the BNF's DEIS on noxious weed control arrived while you and I were enjoying the elk drive-netting on the Blacktail WMA. As our department's weed project coordinator, the following are some concerns.

Problem Statement: The statement is good because it expresses BNF's desire to evaluate the situation rather than advocating a broadscale control program based on assumptions.

Issues 1-10: Because they are stated under the Problem Statement, I assume each is a hypothesis and each will be objectively evaluated by some prescribed criteria. This seems especially appropriate because Nos. 1-3 are statements of conjecture as they pertain to wildlife at this time. Neither of the plant species mentioned in No. 6 (tall larkspur) or No. 7 (mules ears) are designated by Montana Law as being noxious and it would not be mandatory to address these species unless a County Weed Board has designated them as noxious. No. 9 is not sufficiently specific to test as a hypothesis.

Your Proposed Alternatives suggest that Issues 1-10 are not hypotheses, but rather statements of fact as perceived by the BNF. That would be unfortunate without some scientific documentation.

The Proposed Alternatives do not include adopting some form of livestock grazing system (eg. rest rotation grazing) that could reduce invasion/establishment and expanded distribution of highly undesirable plant species. Similar recognition could be given to minimizing road construction and maintenance, revegetation of roadsides and unused roads, and preventing introduction/reintroduction of undesirable species by requiring certified weed-free hay only be used on the forest.

Hope these comments are useful in determining your final EIS approach.

Sincerely,

John P. Weigand
Bureau Chief

MEMBERS OF THE CLAREMONT COLLEGES

JOINT SCIENCE DEPARTMENT
BIOLOGY
CHEMISTRY
PHYSICS

JOINT SCIENCE DEPARTMENT
JOINT SCIENCE BUILDING
11TH AND DARTMOUTH AVENUES
CLAREMONT, CALIFORNIA 91711

3/9/86

Re. Weed Control

In rush, since we didn't get time to respond more fully. Two points

① Alternative 4 – is what we call integrated control. Integrated control can be the most intelligent use of all methods available. It seldom is, however! It usually boils down to "spray the hell out of everything" by some untrained, unknowledgable person who is given a spray hose & a tank of chemical. We see that locally with the City, County & USFS! Therefore, I opt for ALTERNATIVE 3.

② I see no recognition in your statements that often noxious weed expansion is due to poor land use practices – particularly overgrazing. Many, if not most, noxious weeds are pioneer species which move in on poor, eroded, denuded, overgrazed soil. Admittedly, soil quality & structure need to be re-established before native vegetation can out-compete invading species. Chemical treatment does not improve soil quality & structure - if anything it harms it and, in the long run, helps sustain the problem.

I hope to see some realization (recognition) of these facts in your management alternatives.

Respectfully,
Clyde H. Eriksen
Professor of Ecology

The Nature Conservancy

Big Sky Field Office
Power Block West
Last Chance Gulch
P.O. Box 258
Helena, Montana 59624
(406) 443-0303

March 10, 1986

52

Ronald C. Prichard
Forest Supervisor
Beaverhead National Forest
P.O. Box 1258
Dillon, MT 59725

86 MAR 12 A10:31

Dear Mr. Prichard,

Thank you for inviting our participation so early in the process of preparing your DEIS on noxious weed control. We are also in the messy business of weed control, and sympathize with your dilemma. The Nature Conservancy manages over 900 private preserves, many of which have significant weed populations that may threaten rare species. We are also working on ecologically sound methods of control.

COMMENTS ON ISSUES

An issue we would like to see added to the list is the impact of noxious weeds on populations of rare plants. We know of a situation in the Bitterroot Valley where the allelopathic effects of spotted napweed are threatening the existence of a rare Montana endemic plant. Although we do not know of any such cases on the Beaverhead, they may exist.

Another issue which needs to be added is the impact of livestock grazing on noxious weed infestation. While it is true that weeds may reduce the available forage (Issue #1), it is also true that livestock grazing may increase the occurrence of noxious weeds. When moving from cultivated and settled areas into the natural ecosystems on forest lands, livestock may carry seeds in the digestive tract or in their coat. Also, overgrazing sets the stage for exotic invaders by stressing native grassland species. Reduction of grazing pressure is one method to consider in an integrated weed control program and shoud be added to the alternative list. This would allow native species to recover their vigor and compete more effectively against invading noxious weeds.

Issue #9, effects of control methods on threatened and endangered species, is the primary concern of The Nature Conservancy. Chemical treatments are particularly risky because of their non-specificity and impacts on soils and groundwater. Areas slated for treatment of any kind should be searched by qualified individuals for the presence of threatened, endangered, and sensitive species.

Sensitive Species. The Nature Conservancy believes that tracking of rare species that are not on the T&E list is important for two reasons. 1) Several species have become extinct while waiting to be listed. This is largely due to budget constraints of the Endangered Species office, which will probably see additional budget cuts. 2) If rare species are monitored before they become threatened, the expense and headache of federal listing can potentially be avoided. The Forest Service's sensitive species program is a very useful system for tracking species that need protection but aren't listed, and for keeping species off the T&E list by a few wise management decisions.

This office submitted comments on the Beaverhead Forest Plan which included all of the information available on rare species in the forest as of June 1, 1985. Since that time, an official Montana Natural Heritage Program has taken over the biological inventory work in the state. Heritage has informed us that they have been contacted and will be providing the Forest with an update on that Forest Plan commentary. Please note that very little inventory work has been done anywhere on the Beaverhead National Forest, and there is a need for data collection. Exhaustive inventorying for rare species on the Beaverhead would be cost prohibitive, and we do not expect the Forest Service to undertake that kind of effort. However, it is essential that areas slated for changes in existing status, such as weed control treatment, be inspected by a qualified individual for rare species occurrences.

The permanent loss, even inadvertently, of any given plant or animal species would be an irreversible tragedy, and must be avoided. The Forest Service mandate to protect "minimum viable populations"(FSM 2621.1) of native species gives the Forest Service a large chunk of the responsibility for preserving the natural genetic diversity of this country. The Nature Conservancy will assist the Forest Service in every way possible to fulfill this obligation, but we are depending on you to make management decisions which reflect the importance of this charge.

ADDITIONAL TREATMENT ALTERNATIVES

As discussed above, reduction of grazing pressure may give native species a better chance of competing against noxious invaders, and should be considered as a possible control method.

An additional method which has been overlooked in your preliminary list, but is a natural for the Forest Service, is prescribed burning. This technique has been used extensively in the rejuvenation of rangeland in the inland northwest with very good results. It is cost effective as well as ecologically safe. There is usually a significant decrease in weedy cover and a corresponding increase in native species cover with few negative impacts to rare, threatened and endangered species. Timing of the treatment is of course very important to protect wildlife species. Prescribed burning is a weed control method which is used widely on our own preserves. We hope that you will give it serious consideration in your treatment alternatives.

Thanks again for giving us this opportunity for comment. Please call me if you have any questions.

Yours sincerely,

Joan Bird
Montana Protection Planner

TO: Beaverhead National Forest Weed Control Team

FROM: Montana Wilderness Association
RE: Noxious Weeds on public lands
March 26, 1986

Dear Beaverhead National Forest Weed Control Team;

Thank you for the opportunity to comment on your National Forest Noxious Weed Control Treatment Program and Draft Environmental Impact Statement. I make these comments on behalf of the Montana Wilderness Association as well as myself.

The Montana Wilderness Association's main concern is keeping noxious weeds out of wilderness and other backcountry areas. This can only be done by getting the weed problem along roads and adjacent areas under control. We therefore support an integrated weed control program, which uses chemical, manual, mechanical, biological, and other effective methods to control weeds. Emphasis should be placed on use of nonchemical methods where applicable.

One important addition we would like to see put into the EIS is a listing of items which will be a part of your weed control program. Each of these policy items are preventive or passive types of control and can be used under any of the alternatives. By listing these items, your control program will be much better understood by both the public and the Forest Service. With this straight forward emphasis and discussion in the final document, the treatment program will have a much greater chance of success.

Listed below are those items which should be included in your Noxious Weed Treatment Program. A good place to list them would probably be the start of the document.

1. The Forest Service should direct action to first halt the spread by eradicating new outbreaks and small infestations, and second, reduce large existing infestations.

2. The Forest Service should emphasize eradication of weed infestaions at trailheads since these are the major source of spread of noxious weeds into the backcountry.

3. The Forest Service should consider the potential for noxious weed introduction and infestations in management decisions. Land use activities which are conducive to the introduction and spread of noxious weeds should be eliminated.

4. The Forest Service should establish a strong weed education program, both internal and external. In particular, all field personnel should be made aware of the weed problem and the forest's weed control program. Trail crews and survey crews could especially help with manual control of the weeds, as well as, helping with the inventory.

5. A complete on-going inventory and monitoring program of all known weed infested areas, treated and untreated, must be implemented in order to have a successful program.

6. The Forest Service should work with counties to identify non-forest weed infested areas (gravel pits, etc.) that are potential sources of infestation to Forest Service lands.

7. Forest Service vehicles, private road construction, logging,

mining, and oil development vehicles should be cleaned regularly to prevent attachment of noxious plant parts or seeds.

8. Parking lots for Forest Service and industry vehicles should be weed free.
9. The cost of weed control should be included in the cost of timber sales, oil leases/exploration, mining activities, and other disturbances.
10. The Forest Service should undertake an active program to revegetate exposed sites and use of certified weed-free seed should be required.
11. The Forest Service should require the use of certified weed-free supplement feed for use in the backcountry.
12. The Forest Service should close roads and eliminate off-road vehicular travel in weed infested areas.
13. Herbicide applicators should be thoroughly trained for proper applicaion techniques and safety precautions.
14. Use of herbicides only as a last resort in wilderness areas.
15. Aerial application of herbicides should be prohibited on Forest Service lands.

Also, we feel a wick applicator should be used in riperian areas.

We complement you on your commitment to initiate a weed control program and hopefully it will be a success.

Sincerely,

Charles H. Ruzicka

Charles H. Ruzicka

TO: Beaverhead National Forest Weed Control Team

FROM: Montana Wilderness Association
RE: Noxious Weeds on public lands
March 26, 1986

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Listed below are those items which should be included in your Noxious Weed Treatment Program. A good place to list them would probably be the start of the document.

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2. The Forest Service should emphasize eradication of weed infestaions at trailheads since these are the major source of spread of noxious weeds into the backcountry. [illegible]

3. The Forest Service should consider the potential for noxious weed introduction and infestations in management decisions. Land use activities which are conducive to the introduction and spread of noxious weeds should be eliminated. [illegible]

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5. A complete on-going inventory and monitoring program of all known weed infested areas, treated and untreated, must be implemented in order to have a successful program. covered

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mining, and oil development vehicles should be cleaned regularly to prevent attachment of noxious plant parts or seeds. difficult - but difficult to [illegible] however [illegible]

8. Parking lots for Forest Service and industry vehicles should be weed free.

9. The cost of weed control should be included in the cost of timber sales, oil leases/exploration, mining activities, and other disturbances. [illegible]

10. The Forest Service should undertake an active program to revegetate exposed sites and use of certified weed-free seed should be required. ongoing

11. The Forest Service should require the use of certified weed-free supplement feed for use in the backcountry. agree

12. The Forest Service should close roads and eliminate off-road vehicular travel in weed infested areas. agree

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14. Use of herbicides only as a last resort in wilderness areas. agree

15. Aerial application of herbicides should be prohibited on Forest Service lands. not proposed

Also, we feel a wick applicator should be used in riperian areas. did not address will deal w/ this time.

We complement you on your commitment to initiate a weed control program and hopefully it will be a success.

Sincerely,

Charles H. Ruzicka

Charles H. Ruzicka

MONTANA WILDERNESS ASSOCIATION
Box 635 • Helena, MT 59624

HELENA, MT 596
PM
26 MAR
1986

USA 22

Beaverhead Natl. Forest
~~Ronald~~ ~~Prichard~~ Dan Pence
~~Dan~~
P.O. Box 1258
Dillon, MT 59725

SKYLINE SPORTSMEN'S ASSOCIATION, INC.
P. O. BOX 173 BUTTE, MONTANA 59701

RE... ...D
86 MAR 10 A 8 52
BEA... ...AD N.F.
DILLON, MT

7 Feb. 1986

Ronald C. Prichard, Supervisor
P.O. Box 1258
Dillon, mt. 59725

Dear Ron,

Thanks for the opportunity to comment on the proposed D.E.I.S. to control noxious weeds on the Beaverhead National Forest.

After participating on the R.C.&D. projet board and in the Stewardship group, we really have a serious problem with noxious weeds.

Our club would be in favor of proposed alternative # 4 with heavy emphasis on using all other methods to control noxious weeds and then use chemicals as a last resort. There should be no aireal spraying of chemicals; it should be done by hand under the most ideal conditions.

The fisheries of the Beaverhead forest are our prime concern - Tordon for example can kill a lot of fish if used improperly as well as other benifical broad-leafed plants. Caution is the name of the game. We realize that leafy spurge for example is very difficult to irradicate and the use of chemicals is practically a necessity on this weed.

If you have further questions, please feel free to contact me.

Respectfully,

Tony Schoonen

President

MONTANA INTERGOVERNMENTAL REVIEW CLEARINGHOUSE
REVIEW AND COMMENT FORM

Applicant: U.S. Department of Agriculture, Forest Service Beaverhead National Forest
Phone: (406) 683-3900

Address: P.O. Box 1258, Dillon , MT 59725

Subject: Draft Environmental Impact Statement - Beaverhead National Forest Noxious Weed Treatment Program

Clearinghouse SAI No. MT860324-489-X

YOUR COOPERATION IS REQUESTED IN COMPLETING YOUR REVIEW AND RETURNING THIS FORM WITH YOUR COMMENTS TO THE ABOVE ADDRESS, WITH A COPY TO THE CLEARINGHOUSE, NO LATER THAN May 12, 1986

	YES	NO	COMMENTS
Is this proposal consistent with the plans, goals and objectives of your agency?	X		
Does the proposed action conflict with any applicable statute, order, regulation or rule with which you are familiar?		X	
Does this proposal overlap, conflict or duplicate other existing programs or agencies?		X	

Describe any suggestions or means of improving or strengthening the proposed plan.

Please convey your general conclusion by checking the appropriate response(s).

☐ Proposal is supported.
☒ Support only with conditions described below.
☐ Non-supportive for the reasons described below.
☐ Additional information is desired as described below.
☐ No comment on this proposal.

REMARKS: All land disturbing actions which result from the Noxious weed Treatment Program should be preceded by cultural resource review in compliance with the National Historic Preservation Act of 1966.

Reviewer: David Schwab SHPO
Title: Archaeologist/Anthropologist
Address: 225 N. Roberts
Phone: 444-7715
Signature:
Date: 4/17/86

Return to Applicant listed above, with a copy to:

Montana IGR Clearinghouse
Lt. Governor's Office, Attn: Room 210
State Capitol
Helena, MT 59620

RE[illegible]

86 APR 25 AM 11:44

BE[illegible]
DILLON MT

Check w/ R.O.
Torre has a Missoula address now

RICK TORRE
321 POPHAM LANE
CORVALLIS MT
59828

57

Ronald Prichard, Forest Supervisor
Beaverhead National Forest
P.O. Box 1258
Dillon, MT 59725

Dear Mr. Prichard:

Thank you for keeping me informed of your herbicide [illegible] [illegible] program's progress.

Please notify me of all decisions regarding these programs.

Please also indicate if your documents include the worse case analysis by Ed Monnig in Region One. Please also indicate the date of that document and the date of the decision notice, or its provision for your use (e.g., accompanying correspondence from regional offices to forest offices).

Thank you,

Rick Torre

- still
needs
answering
5-16-86 -

Ronald Prichard, Forest Supervisor
Beaverhead National Forest
P.O. Box 1258
Dillon, Montana 59725

Dear Mr. Prichard:

Thank you for the opportunity to comment on your planned noxious weed program. I will try to identify what I consider are the most significant issues your EA's should address.

Most significantly, you should adequately discuss the adverse impacts of noxious weeds vs. the dangers of chemical treatment methods, both known and unknown dangers.

[illegible]

Herbicides have been the subject of intense controversy in Region 6. They have been associated with higher rates of spontaneous abortion and birth defects in areas of their use.

Accordingly, through citizen initiated litigation, the courts have time and again required the agency to do more complete studies of the consequences of herbicide use. Their decisions have led to the writing of the worse case analysis (by Ed Monnig in Region 1), which you will be using in your EA to evaluate risk.

The agency is at task to compile these facts, and apply the law, in their decision. Prejudice in compiling these facts, omitting interdisciplinary research, not having the most state of the art information, is improper for discretionary decisions.

In other words, discretionary fact finding is as improper as unlimited discretion in administrative agencies.

I have reviewed Mr. Monnig's document, and can point to several perceived inadequacies (example, lack of quantitative data on dermal absorption, only comparative data is used, pg. 21).

But rather than question the agency's data, I ask that:

The agency include data which would not support use, date which contradicts the longevity, chemical conversion into nitrosomes, and other contradictions and discuss their influence of your decision. ?

The agency include a summary of the legal complications which have arisen from herbicide use and proposed use in Region 6. This should include litigation and the issues the litigation addresses, as well as the court's decisions. Also should be mentioned is the insurance problems Montana's counties have experienced because of liability incurred from herbicide programs.

see [illegible] [illegible] [illegible] update of [illegible] analysis

not [illegible] [illegible] limited to herbicides, [illegible] programs in [illegible]

Only by these inclusions and discussions can the average citizen, or unbiased administrator, make a reasonable decision on the safety of herbicides. There need also be an adequate, equally addressed range of alternatives.

I believe, on the basis of past experience, that the agency is already biased in the direction of herbicide use.

I believe the known and unknown danger are substantial enough to warrant close scrutiny of a policy for their use.

Again, only by considering both supportive and subtractive facts, can a decision be made, consistent with the limits on discretion the courts have intended.

Also, as I have previously mentioned, I have reviewed the WCA for noxious weeds, and have accumulated a large volume of date, of both law and fact, concerning herbicides.

I herein formally request a copy of all EAs, EIS, and decision notices concerning herbicide use to control noxious weeds.

I also request previous unit plans for these areas.

I also request past environmental documents for past herbicide programs on the Forest, as well as dates of execution, post-project monitoring, etc.

Thank you again for the opportunity to participate in this process. Please contact me if I may be of further help.

Thank you,

Rick Torre

58

STATE OF MONTANA
DEPARTMENT OF AGRICULTURE

OFFICE OF THE DIRECTOR
AGRICULTURE/LIVESTOCK BLDG.
CAPITOL STATION
HELENA, MONTANA 59620-0201

TELEPHONE:
AREA CODE 406
444-3144

TED SCHWINDEN
GOVERNOR

KEITH KELLY
DIRECTOR

May 9, 1986

Mr. Ronald C. Prichard
Forest Supervisor
Beaverhead National Forest
P. O. Box 1258
Dillon, MT 59725

Dear Mr. Prichard:

The Montana's Interagency Planning Task Force has reviewed and made the enclosed comments on the Draft Environmental Impact Statement (DEIS) for the Beaverhead National Forest Noxious Weed Control Program. The information presented in the DEIS was complete, well organized and easy to comprehend. We support the use of all feasible methods, described in the preferred alternative, to control noxious weeds on the Beaverhead National Forest.

We look forward to your consideration of our comments and your response to them in the final EIS. We appreciate your agency's attempts to deal with the noxious weed problem on the National Forest.

Sincerely,

Keith Kelly

Keith Kelly
Director

JEL/bnfdeis.ws
Enclosure

	SUPERVISOR		ENGINEERING SO
✓	PLANNING SO		GENERAL
	TMBR PLANNING		PRECONSTR
✓	RANGE/WLDF SO		CONSTRUCTION
	HYDROLOGY		TRANS PLANNER
	WILDLIFE		ADMIN SO
	GEO/MINING		PERSONNEL
	SOILS		[illegible]
	TMBR/REC SO		
	SILVICULTURE		SUPPORT SVCS
	TMBR/SALES FIRE		[illegible] REC
	LNDSCP/ARCH REC	✓	RESOURCES
	RIGHT-OF-WAY		COPY TO:
	OTHER		

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List of Agencies, Organizations, Officials and Individual to Whom Copies are Sent.

ELECTED OFFICIALS

Max Baucus, U.S. Senator
John Melcher, U.S. Senator
Ron Marlenee, U.S. Congressman
Pat Williams, U.S. Congressman
Ted Schwinden, Governor

Montana County Commissioners for
  Beaverhead County
  Deerlodge County
  Madison County
  Silverbow County
John H. Anderson, Jr, State Senator
Bill Hand, State Representative

MONTANA STATE AGENCIES

Department of Agriculture
Department of Fish, Wildlife and Parks
Natural Heritage Program
Intergovernmental Clearing House

INDIVIDUALS AND ORGANIZATIONS

Skyline Sportsmen
Nature Conservancy
Mike Lingholm
Jack Taylor, MSU Range Dept.
Rick Torre
W.G. Gilbert, Jr.
Outdoors Unlimited
Montana Public Lands Council
Earl R. Peterson
Clyde Eriksen, Claremont Colleges
Clayton Huntley
Ray Weaver
Public Lands Council
Henry Greitl, Beaverhead County Weed Supervisor
Charles F. Tiernan
Montana Wilderness Association
Maynard Smith, East Pioneer Exp. Stewardship Program

FEDERAL AGENCIES

Agricultural Research Service
Animal & Plant Health Inspection Service
Bureau of Land Management
Cooperative Extension Service
Environmental Protection Agency, Region 8, Montana Office
U.S. Fish and Wildlife Service
U.S. Forest Service,
  Northern Regional Office
  Bitterroot National Forest
  Deerlodge National Forest
  Gallatin National Forest
  Salmon National Forest
  Targhee National Forest
  Rocky Mountain Forest and Range Experiment Station
Resource Conservation and Development, Headwaters Area
Soil Conservation Service
USDI, Bureau of Reclamation

Neil Peterson, Madison County Weed Control Coordinator
Janet Bean-Dochnal, Madison County Weed Board Chairman
Nick Novich
Roscoe Pilon
Harry Grose, Grose Ranches
Les Gilman, Gilman Cattle Co.
Ralph Nichols, Lazy Three S Ranch
James A. Collins, Lakeview Ranch
Beartooth Outfitters
William H. Doggett, Doggett Ranch
Jack Tuholske

ADDITIONAL COPIES WILL BE DELIVERED TO OTHERS ON REQUEST

GLOSSARY

ACCEPTABLE DAILY INTAKE (ADI): The maximum dose of a substance that is anticipated to be without lifetime risk to humans when taken daily.

ACID EQUIVALENT (A.E.): The amount of active ingredient expressed in terms of the parent acid.

ACUTE: Referring to a disease or disorder of rapid onset, short duration, and pronounced symptoms.

ADSORPTION: Adhesion of substances to the surfaces of solids or liquids; technically, the attraction of ions of compounds to the surfaces of solids or liquids.

AEROSOLS: A suspension of fine solid or liquid particles in gas (as smoke, fog, or a pesticide).

AIRSHEDS: A geographic area that, because of topography, meteorology, and climate, shares the same air. As applied to the National Forest by the Clean Air Act, amended August 1977, the term covers all wilderness areas larger than 5,000 acres that were in existence as of August 1977.

ALLELOPATHIC: Pertaining to the suppression of growth of one plant species by another through the release of toxic substances.

ALLOTMENT (GRAZING): An area designated for use of a prescribed number and kind of livestock under one management plan.

ALLUVIAL DEPOSITS: Deposits of sand, gravels, and cobbles resulting from the reduction in carrying capacity of flowing water. As flowing water slows, its carrying capacity drops, allowing material to settle out.

AMINE: Any of a group of chemical substances formed by exchanging one, two, or three hydrogen atoms for one, two, or three hydrocarbon groups.

ANIMAL UNIT MONTH (AUM): As used in this document, the AUM equates to 780 pounds of air dry forage made availabe for a 30-day period. Considered to be the equivalent of the requirement of a single 1,000 pound cow or another class of ungulate based on 26 pounds of forage per day for 30 days. This allowance may serve several sheep or deer.

ANNUAL PLANT: A plant that completes its life cycle within a year.

AQUIFERS: An underground zone that yields important amounts of water to wells.

BATHOLITH: A great mass of intruded igneous rock that for the most part stopped in its rise a great distance below the surface.

BENIGN: Of no danger to life or health.

BIENNIAL PLANT: A plant that normally completes its life cycle in two years.

BIOACCUMULATION: The accumulation of a substance in an ecosystem. A chemical that does not bioaccumulate, decomposes rapidly in the environment.

BIOASSAY: The testing of the effects of chemical substances on live organisms under controlled conditions.

BIODEGRADABLE: A substance that can be broken down by microorganisms.

BIOLOGICAL AGENTS: The use of natural enemies (insects, parasites) to attack a target plant, retard growth, prevent regrowth, or prevent seed formation.

BIOLOGICAL ASSESSMENT: A documented Forest Service review of Forest Service programs to determine whether the proposed action is likely to affect an endangered or threatened species.

BOOM (HERBICIDE SPRAY): A tubular device that conducts a herbicide mixture from a tank to a series of spray nozzles. A boom may be mounted beneath an aircraft or behind a tractor.

BROADCAST APPLICATION: The applying of pesticide over an entire area or field rather than only to rows, beds, or individual plants. See SPOT TREATMENT.

BUFFER (STRIP OR ZONE): A zone left untreated with herbicide (at the outer edge of a treated area or along streams) as protection against the effects of treatment.

CARCINOGEN: Any cancer-producing substance.

CARCINOGENIC: A substance producing or inciting cancer.

CARRIER: Material added to an active ingredient to facilitate its preparation, storage, shipment, or use.

CATEGORICAL EXCLUSION: A category of actions that do not individually or cumulatively have significant effects on the human environment and for which neither an environmental assessment nor an environmental impact statement is required.

CHEMICAL DEGRADATION: The breakdown of a chemical substance into simpler components through chemical reactions.

CHRONIC: Long continued; of long duration.

CHRONIC TOXICITY: The poisoning effects of a series of small doses applied over a long period.

CLASS 1 AREAS (AIR QUALITY): All wildernesses in existence prior to August 1977. The Clean Air Act requires the Federal Land Manager to affirmatively protect the air quality related values within these mandatory Class I areas. These are the "cleanest" areas which also receive special visibility protection.

CLASS 2 AREAS: All wilderness and nonwilderness National Forest System lands not designated Class I. The policy is to maintain or improve the air quality within Class II areas.

COLLOID: See SOIL COLLOID.

CONCENTRATION: The amount of active ingredient or acid equivalent in a quantity of diluent, expressed as lb/gal, ml/liter, etc.

CONJUNCTIVA: The mucous membrane covering the eyeball and lining the eyelids.

CONTROL: Reduction of a pest problem to a point where it causes no significant economic damage.

CREEPING PERENNIALS: Perennial plants that spread by means of specialized modified aboveground stems (stolons) or belowground stems (rhizomes) as well as by seeds. Because of their method of spread, creeping perennial noxious weeds often are the most difficult to control.

CULTURAL RESOURCES: Remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, building, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in past human events. Cultural resources consist of (1) physical remains, (2) areas where significant human events occurred, even though evidence of the events no longer remains, and (3) the environment immediately surrounding the actual resource.

DELETERIOUS PLANT GROWTH: Plant growth which is injurious or harmful to the plant.

DERMATITIS: Inflamation of the skin.

DNA (DEOXYRIBONUCLEIC ACID): Any of the nucleic acids that are the molecular basis of heredity.

DOSAGE: The regulation of doses: how often and for how long.

DOSE: A given quantity of test material that is taken into the body; quantity of material to be administered.

DRIFT: The movement of airborne herbicide particles by air motion or wind away from an intended target area.

DUST: A dry, finely ground carrier material containing a pesticide active ingredient; used without further dilution.

ECOLOGICAL NICHE: The physical space in a habitat occuped by an organism; its functional role in a community; and its position in environmental gradients of temperature, moisture, pH, soil, and other conditions of existence.

EMULSIFIABLE CONCENTRATE: A liquid formulation obtained by dissolving the technical active ingredient in a liquid solvent, and adding one or more emulsifiers, so that the formulated pesticide can be further diluted with water or oil for spray application.

ENDANGERED SPECIES: Plant or animal species that are in danger of extinction throughout all or a significant part of their range. See THREATENED SPECIES.

ENVIRONMENTAL ASSESSMENT (EA): A systematic environmental analysis of site-specific activities used to determine whether such acitivites would significantly affect the human environment, and whether an environmental impact statement is required.

ENVIRONMENTAL IMPACT STATEMENT (EIS): An analytical document developed for use by decisionmakers to weigh the environmental consequences of a potential action.

EPHEMERAL STREAM: A stream that flows only in direct response to precipitation and whose channel is at all times above the water table.

EQUIVOCAL RESULTS: Results which are uncertain.

ESTER: A substance formed by the reaction between an acid and an alcohol, usually with the elimination of water.

EXOTIC PLANTS: Plants that are not native to the region in which they occur.

EXPOSURE: Application of test material to the external surfaces of a test organism; takes into consideration route, duration, and frequency.

FATE (HERBICIDE): What happens to a herbicide after it is applied, including leaching, photodecomposition, and microbial degradation.

FETOTOXIC: Toxic to a fetus.

FOOD CHAIN: A series of plant or animal species in a community, each of which is related to the next as a source of food.

FORAGE: All browse and herbaceous foods available to grazing animals. Forage may be grazed or harvested for feeding.

FORB: A low-growing herbaceous plant that is not a grass, sedge, or rush.

FOREST LAND MANAGEMENT PLANS: Plans which direct the management of National Forest System lands.

FORMULATION: (1) A pesticide preparation supplied by a manufacturer for practical use. (2) A manufacturing process by which technical active ingredients are prepared for practical use by mixing with liquid or dry diluents, grinding, or by the addition of emulsifiers, stabilizers, and other adjuvants.

HABITAT: The environment in which an organism occurs.

HALF-LIFE: The time required for half the amount of a herbicide introduced into a living system to be eliminated or disintegrated by natural processes.

HECTARE: 10,000 square meters or about 2.47 acres.

HERBICIDE: A substance used to inhibit or destroy plant growth. If its effectiveness is restricted to a specific plant or type of plant, it is called a selective herbicide. If it is effective for a broad range of plants, it is called nonselective.

HERBIVORE: An animal that exclusively eats plants.

HISTOPATHOLOGIC: Pertaining to tissue changes characteristic of diseases.

HUMAN HEALTH RISK ANALYSIS: Also referred to as Worst-Case Analysis, is an analysis of the risks to human health from utilizing the four herbicides proposed for use. The analysis is formulated on the basis of available information, using reasonable projections of the worst possible consequences of the proposed action. In addition to the analysis of a low probability/catastrophic impact event, the analysis also includes a spectrum of events of higher probability but less drastic impact.

INTEGRATED PEST MANAGEMENT (IPM): Use of several methods to control pests. In this document, IPM refers to use of biological agents, herbicides, and manual treatments.

INTERMITTENT STREAM: A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow.

INTERMOUNTAIN REGION: That part of the National Forest System which encompasses National Forests within the Intermountain Region (Utah, southern and central Idaho, western Wyoming, Nevada, and portions of California and Colorado).

IN VITRO: Outside the living body and in an artificial environment.

LABEL: All written, printed, or graphic matter on or attached to pesticide containers as required by law.

LACTATION: To secrete milk.

LC: Lethal concentration.

LC_{50}: The median lethal concentration; the concentration of toxicant necessary to kill 50 percent of the organisms being tested. It is usually expressed in parts per million (ppm).

LD_{50}: The median lethal dose; the size of a single dose of a chemical necessary to kill 50 percent of the organisms in a specific test situation. It is usually expressed in the weight of the chemical per unit of body weight (mg/kg). It may be fed (oral LD_{50}), applied to the skin (dermal LD_{50}), or administered in the form of vapors (inhalation LD_{50}).

LEACHING: The movement of chemicals through soil by water or the movement of herbicides out of leaves, stems, or roots into the air or soil.

LETHAL DOSE: A dose resulting in the death of an organism.

MALIGNANT: Tending to produce death or deterioration.

MECHANICAL CONTROL: Use of plows and other mechanical devices to manipulate vegetation.

MERISTEMATIC AREAS: Areas where plant tissue divides and grows.

METABOLISM: The chemical processes in living cells by which new material is assimilated and energy is provided for vital processes.

METABOLITE: Any substance taking part in or produced by metabolism.

MICROBIAL DEGRADATION: The breakdown by bacteria of chemical substances into simpler components.

MICROCLIMATE: Climatic conditions characteristic of a small area. Microclimates are influenced by local geography and vegetation and may differ from regional climate in temperature, wind, length of growing season, and precipitation.

MICROGRAM: One millionth of a gram.

MICRONS: A unit of length equal to one-thousandth of a millimeter.

MICROORGANISMS: An organism of microscopic size.

MITIGATING MEASURES: Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice.

MOBILITY (HERBICIDE): The capability of a herbicide to be moved easily within the soil, vertically or laterally, with the normal movement of water.

MONOCULTURE: Area of vegetation consisting of one plant species.

MULTIPLE USE: The management of all the various surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land with consideration being given to the relative values of the various resources and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

MUTAGEN: A substance that tends to increase the frequency or extent of genetic mutations (changes in hereditary material).

MUTAGENIC: Capable of inducing a mutation. An agent that tends to increase the occurrence or extent of mutation.

MYONEURAL: Of or relating to both muscle and nerve.

NATIONAL REGISTER OF HISTORIC PLACES: The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation. The Register lists archaeological, historic, and architectural properties (districts, sites, buildings, structures, and objects) nominated for their local, State, or National significance by State and Federal agencies and approved by the National Register Staff. The Register is maintained by the National Park Service.

NEUROPATHY: An abnormal and usually degenerative state of the nervous system or nerves.

NOEL: In a series of dose levels tested, it is the highest level at which no effect is observed, i.e., safe, in the species tested. It is the no observable effect level.

NONSELECTIVE HERBICIDES: A herbicide that kills or damages all vegetation to which applied.

NONTARGET VEGETATION: Vegetation that is not planned to be affected by treatment.

ONCOGENIC (TUMORIGENIC): Capable of producing or inducing tumors in animals. The tumors may be either malignant (cancerous) or benign (non-cancerous).

ORGANOGENESIS: The formation of organs in animals.

PALEONTOLOGY: A science dealing with life of past geological periods as from fossils.

PATHOGEN: A specific causative agent of disease, such as a bacterium or virus.

PERENNIAL PLANT: A plant that completes its life cycle in more than 2 years.

PERENNIAL STREAM: A stream that flows continuously year round.

PERNICIOUS (PERNICIOUS PLANTS): Harmful or destructive to other organisms.

PERSISTENCE: The resistance of a herbicide to metabolism and environmental degradation, and thus a herbicide's retention of its ability to kill plants for prolonged periods.

PESTICIDE: Any substance or mixture of substances intended for controlling insects, rodents, fungi, weeds, or other plants and animals that are considered pests.

PETIOLE: A slender stem that supports the blade of a foliage leaf.

pH: A numeric value that gives the relative acidity or alkalinity of a substance on a 0 to 14 scale with the neutral point at 7.0. Values lower than 7.0 show the presence of acids, and values greater than 7.0 show the presence of bases.

PHLOEM: A complex, food-conducting vascular tissue in plants.

PHOTODECOMPOSITION (PHOTODEGRADATION): The breakdown of a substance, especially a chemical compound, into simpler components by the action of sunlight.

PHOTOSYNTHESIS: Formation of carbohydrates in the tissues of plants exposed to light.

PHYSIOGRAPHIC DIVISIONS: Divisions resulting from land surfaces created by geological processes of intrusion, deposition, erosion, or structural movement.

PHYTOTOXIC: Poisonous to plants.

PRESCRIBED FIRE: The intentional burning of wildland fuels in either their natural or modified states under conditions to allow the fire to continue to a predetermined area and to produce the intensity of heat and rate of spread needed to meet certain objectives.

PULASKI: Hand tool with dual head consisting of an axe-type and hoe-type blades.

RAPTORS: Birds of prey, such as owls, hawks, or eagles.

RATE: The amount of active ingredient or acid equivalent applied per unit area or other treatment unit.

REGISTERED (REGISTERED FOR USE): A herbicide which has been approved for use by the Environmental Protection Agency according to label directions.

RESEARCH NATURAL AREA: A physical or biological unit in which current natural conditions are maintained insofar as possible. In such areas, activities such as grazing and vegetation manipulation are prohibited unless they replace natural processes and contribute to the protection and preservation of an area. Such recreation activities as camping and gathering plants are discouraged.

RESIDUE: That quantity of herbicide, its degradation products, and/or its metabolites remaining on or in the soil, plant parts, animal tissues, whole organisms, and surfaces.

RHIZOME: An underground root-like stem, that produces roots and leafy shoots and provides a means for some plants to reproduce.

RIPARIAN: Pertaining to or located along a streambank or other water bodies, such as ponds, lakes, reservoirs, or marshes.

RISK: The probability that a substance will produce harm under specified conditions.

ROSETTE: A cluster of leaves in crowded circles or spirals arising basally from a crown or apically from an axis with greatly shortened internodes.

RUNOFF: The part of the precipitation in a drainage area that is discharged from the area in stream channels, including surface runoff, groundwater runoff, and seepage.

SAFETY: The reciprocal of risk, i.e., the probability that harm will not occur under specified conditions.

SEDGES: Grasslike plants.

SELECTIVE: A herbicide that kills or damages a particular species or group of species with little or no injury to other plants.

SCOPING: The process by which significant issues relating to a proposal are identified for environmental analysis. Scoping includes eliciting public comment on the proposal, evaluating concerns, and developing alternatives for consideration.

SEDIMENTATION: The process or action of depositing sediment.

SENSITIVE SPECIES (PLANTS): Plant species not officially listed as threatened or endangered but that are undergoing a status review or are proposed for listing by either Federal Register notices published by the Secretary of the Interior or the Secretary of Commerce or by comparable State documents.

SOIL COLLOID: An extremely small particle of clay or organic matter exhibiting correspondingly large surface area per unit of mass, to which herbicides may be adsorbed.

SOIL PROFILE: A vertical section of the soil from the surface through all its horizons, including C horizons.

SORPTION: The process of taking up or holding by either absorption or adsorption.

SPOT TREATMENT: Applying pesticide to a selected individual area as opposed to broadcast application.

SUBCHRONIC TOXICITY: Effects of regularly repeated doses or exposures over periods ranging from a few days to several months.

SURFACTANTS: A soluble compound that reduces the surface tension of liquids, thereby increasing penetration into plants.

SYSTEMIC HERBICIDE: A herbicide applied directly to a plant, which is absorbed in its leaves and then translocated throughout the plant.

TARGET PLANTS: Noxious weeds and poisonous plants.

TERATOGEN: Any substance capable of producing structural abnormalities of prenatal origin, present at birth or manifested shortly thereafter (the ability to produce birth defects).

TERATOGENESIS: Birth defects.

THREATENED SPECIES: Plant or animal species that are not in danger of extinction but are likely to become so within the foreseeable future throughout all or a significant portion of their range. See ENDANGERED SPECIES.

TISSUE BURDEN: The cumulative effects of a substance on a particular tissue.

TOLERANCE: Acceptable level of pesticide residues.

TOXICITY: (1) The capacity or property of a substance to cause any adverse effects. It is based on scientifically verifiable data from animal or human exposure tests. (2) That specific quantity of a substance which may be expected, under specific conditions, to do damage to a specific living organism.

TRANSLOCATION: The transfer of substances from one location to another in the plant body.

TUMORIGENIC: Causing tumors.

UNDERSTORY VEGETATION: Plants, usually grasses, forbs, and low shrubs, growing beneath the canopy of other plants.

UNGULATES: Hoofed mammals, most of which are herbivores.

VAPOR PRESSURE: The pressure of vapor produced by a solid or liquid. In particular, the term is used for the saturated vapor pressure, which is the pressure of vapor in equilibrium with the solid or liquid.

VASCULAR PLANT: A plant that has a specialized conducting system consisting of xylem and phloem.

WATER TABLE: The upper limit of the part of the soil or underlying rock material that is wholly saturated with water.

WEED: Refers to noxious weeds.

WEED-INFESTED ACRE: Any part of an acre of land that is infested with weeds.

WILDERNESS: An area designated by Congress as part of the National Wilderness Preservation System. Wilderness areas are generally undeveloped Federal lands that retain their primeval character and influence without improvements or human habitation.

WORST-CASE ANALYSIS: See HUMAN HEALTH RISK ANALYSIS.

XYLEM: The non-living tissue which functions primarily to conduct water and mineral nutrients from the roots of plants.

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APPENDIX A

Biological control consideration for noxious weeds on National Forest System lands in the Intermountain Region. Information obtained from the Agricultural Research Service, USDA.

Plant amenability to biological control through the introduction of foreign organisms and the status of biological control research and implementation.

Weed Species	Amenability to Biological Control[1]	Status of Research and Implementation[2]	Action Needed
Leafy spurge *Euphorbia esula*	4-rating. There are a large number of related *Euphorbia* spp. native to the U.S. which can limit the number of agents suitable for introduction to the U.S.	*Hyles euphorbiae* clear/estab.; *Oberea erythrocephala* clear/estab.; *Bayeria capitigena* clear; 5 other arthropods and one plant pathogen are under study.	1. Further collection of agents from Europe for introduction to U.S. 1985-90. 2. Testing of new agents in Europe and U.S. quarantine. 1985-90. 3. Exploration for new agents in Europe and Asia. 1985-90.
Spotted knapweed *Centaurea maculosa*	10-rating. There are only two *Centaurea* spp. native to the U.S. Safflower and artichoke are two close economic relatives but are in separate genera.	*Urophora affinis* clear/estab.; *Metzneria paucipunctella* clear/estab.; *Agapeta zoegana* clear; 3 other arthropods are under study; a third insect entered from Canada and is also established.	1. Further collections of agents in Europe which are already cleared for release. 1985-90. 2. Redistribution of established species to new sites. 1985-90. 3. Testing in Europe and U.S. 1985-90. 4. Foreign exploration for plant pathogens and for new sites collect above cleared arthropods. 1985-90.

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[1] The amenability of each species to biological control is rated on a 1-10 scale (1 = low amenability). A weed is rated 1 if it is a species native to the U.S.; if it has close relatives of economic importance (i.e., crop plants, ornamentals), or if it is of ecological importance (i.e., the close plant relatives may be of value to wildlife or listed as rare and endangered plants). A low rating does not mean that biological control is impossible, but only that it may be more difficult to find host specific organisms that can be safely used with few economic or ecological side effects.

[2] "Clear indicates organism cleared for released in U.S. "Estab." indicates organism established. All cleared organisms have been released. Only some have established.

Plant amenability to biological control through the introduction of foreign organisms and the status of biological control research and implementation.

Weed Species	Amenability to Biological Control[1]	Status of Research and Implementation[2]	Action Needed
Canada thistle *Cirsium arvense*	3-rating. 100+ *Cirsium* spp. are native to U.S. None are of economic importance but several are listed as rare or endangered.	*Altica carduorum* clear; *Ceutorhynchus litura* clear/estab.; *Urophora cardui* clear/estab.; No new agents being tested because of closely related native species.	1. Redistribution of established species. 1986.90. 2. Surveys in Europe for plant pathogens and and new agents. Date? 3. Development of indigenous plant pathogens. Date?
Musk thistle *Carduus theormeri*	5-rating. No native U.S. *Carduus* sp. but insects may go to 100+ *Cirsium* spp. native to U.S.	*Rhinocyllus conicus* clear/estab.; *Trichosirocalus horridus* clear/estab.; *Cheilosia corydon* under study.	1. Redistribution of established species. 1986-90. 2. Further testing and survey in Europe. Expect completion of studies 1987 or 88. 3. Survey and testing of plant pathogens in Europe and U.S. quarantine. 1985-90.
Dalmation toadflax *Linaria dalmatica*	6-rating. Few native *Linaria* spp. but there are closely related species indigenous to U.S. Snapdragon is a close relative.	*Calophasia lunula* clear; 2 other arthropods have been studied.	1. Obtain cleared insect from area climatically similar to U.S. infestations. (Work postponed due to question of economic importance of weed vs. the value of snapdragon. Need to resolve economic importance of weed. 2. Survey and test new agents. Date?

Plant amenability to biological control through the introduction of foreign organisms and the status of biological control research and implementation.

Weed Species	Amenability to Biological Control[1/]	Status of Research and Implementation[2/]	Action Needed
White top *Cardaria draba*	3-rating. No native *Cardaria* in U.S. but large number of cruciferous crops.	Surveys for natural enemies made in Poland. Several potential agents found.	1. Test known potential candidates on U.S. weed plants and on crucifers of value; 2-4 years of testing needed. 2. Surveys for other agents and plant pathogens needed. 2-4+ years.

Plant amenability to biological control through the introduction of foreign organisms and the status of biological control research and implementation.

Weed Species	Amenability to Biological Control[1/]	Status of Research and Implementation[2/]	Action Needed
Black henbane *Hyoscyamus niger*	7-rating. Single weed species in U.S.; introduced. Several related sclanaceous crops and native species (unknown value) are present in U.S.	No work underway.	To be determined.

APPENDIX B

THREATENED AND ENDANGERED SPECIES BIOLOGICAL EVALUATION OF THE PREFERRED ALTERNATIVE, CONTROL OF NOXIOUS WEEDS AND UNDESIRABLE PLANTS BEAVERHEAD NATIONAL FOREST

I. INTRODUCTION

The objective of this biological evaluation is to determine the effects of the Beaverhead National Forest's Proposed Control of Noxious Weeds and Undesirable Plants Preferred Alternative on threatened or endangered plant and animal species or their habitats.

II. DESCRIPTION OF PROPOSAL

The preferred alternative provides for integrated control (combination of manual, mechanical, biological and chemical methods) on about 7687 acres of noxious weeds and undesirable plants on the Beaverhead National Forest.

III. THREATENED AND ENDANGERED SPECIES

A. Grizzly Bear (Threatened)

1. Habitat Areas - While no "occupied" grizzly bear habitat has been delineated on the Beaverhead National Forest by the Yellowstone Recovery Plan, the grizzly bear is known to utilize portions of the Madison Range and is an occasional visitor of the Tobacco Root Mountains and the Gravelly Range.

2. Determination of Effects - The Preferred Alternative does not propose any actions that would adversely impact the grizzly bear in the Madison Range. The alternative will not affect the continued use of the area by the grizzly bear. Grizzly bear observations in the Tobacco Root and Gravelly Range are very infrequent and it is difficult to determine if bears are actually using areas with any consistency. The existing sporadic use by grizzly bears will continue. No adverse impacts will occur on the animals themselves or their food chains with proper application rates and precautionary measures when using herbicides. In addition , since grizzly use is so infrequent, the potential for impacting grizzlies is very slight.

B. Gray Wolf (Endangered)

1. Habitat Areas - The gray wolf is an occasional visitor to portions of the Continental Divide southwest of Dillon. No occupied habitat has been delineated on the Forest. No evidence of pack activity exists on the Forest.

2. Determination of Effects - The probality of wolf activity occurring in the proposed treatment areas identified within the preferred alternative is very low. No direct or indirect effects on the wolf are expected from the proposed control of noxious weeds and undesirable plants. No direct impacts on the animals or their food chains would occur with proper application rates and precautionary measures when using herbicides.

C. Peregrine Falcon (Endangered)

1. Habitat Areas - There is no known occupied peregrine falcon habitat on the Beaverhead National Forest. Essential unoccupied habitat has been delineated in the southeast portion of the Gravelly Range.

2. Determination of Effects - Since there are no known nesting sites for the peregrine falcon on the Forest, no impacts will occur. No adverse effects will occur on the essential unoccupied habitat. No adverse impacts will occur on the birds themselves or their food chains with proper application rates and precautionary measures when using herbicides.

D. Bald Eagle (Endangered)

1. Habitat Areas - Numerous bald eagles migrate through the Forest in the spring and fall. The larger rivers near the Forest do support some wintering bald eagles. The majority of the migration and wintering activity is not on the Forest. There are three active bald eagle nests located in the southeast portion of the Gravelly Range.

2. Determination of Effects - The closest spraying to the Wade Lake bald eagle nest is one half mile away. There won't be any spraying done at all near the other two nests at Cliff Lake and Elk Lake. This project will not affect the bald eagle. No adverse impacts will occur on the birds themselves or their food chains with proper application rates and precautionary measures when using herbicides.

E. Whooping Crane (Endangered)

1. Habitat Areas - The whooping crane is a summer resident known to occur at the Red Rocks Lake National Wildlife Refuge. One whooping crane was observed in 1981 and also in 1985 from May through September at the Red Rocks Lake Refuge (Kurtendach, 1986). This crane is part of the Grays Lake flock in Idaho. There is a possibility that the whooping crane could have been on the Forest in the southeastern portion of the Gravelly Range which adjoins the Refuge.

2. Determination of Effects - Since no known use by the whooping crane occurs on the Forest, no impact to this T&E species is anticipated. No adverse impacts will occur on the birds themselves or their food chains with proper application rates and precautionary measures when using herbicides.

F. Penstemon lemhiensis (Proposed for listing)

1. Habitat Areas - This plant inhabits portions of the Pioneer Mountains west of Dillon near Argenta and also in the Big Hole Battlefield area west of Wisdom. It is found in scattered locales on BLM, private land as well as the Forest.

2. Determination of Effects - Since each person involved in the on-the-ground control of noxious weeds and undesirable plants will be trained in the identification of Penstemon lemhiensis, no impact to this plant species is anticipated.

In conclusion, the direction provided by the preferred alternative of the Proposed Control of Noxious Weeds and Undesirable Plants EIS will not affect the continued existence of the threatened and endangered species mentioned in this document. There should be no adverse cumulative impacts from other Federal, State or private projects in the area. The expected status of the T&E species in the future (short- and long-term) during and after project completion should not change.

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APPENDIX C

FEDERAL AND STATE NOXIOUS WEED CONTROL LAWS

There are several laws that give broad authority for control of noxious farm weeds on National Forest System land as well as a few laws and regulations that specifically provide for control of such weeds. Specific laws and regulations are:

36 CFR Sub. A, Sec. 222.8 states that "the Chief, Forest Service, will cooperate with county or other local weed control districts in analyzing noxious farm weed problems and developing control programs in areas which the National Forests and National Grasslands are a part."

Federal Noxious Weed Act of 1974 (Sec. 9) authorizes the Secretary to cooperate with other Federal agencies, State agencies or political subdivisions thereof, and individuals in carrying out measures to eradicate, suppress, control, or prevent the spread of any noxious weed.

Carlson-Foley Act of October 17, 1968, (Public Law 90-583), authorized and directed heads of Federal departments and agencies to permit control of noxious plants on Federal land by State and local Governments on a reimbursement basis in connection with similar and acceptable weed control programs being carried out on adjacent non-Federal land. This Act carries the provision "That such reimbursement shall be only to the extent that funds appropriated specifically to carry out the purposes of this Act are available, therefore, during the fiscal year in which the expenses are incurred."

The Federal Land Policy and Management Act of October 21, 1976, (Public Law 94-579) provides authority to control weeds on range land as a part of a rangeland improvement program.

The National Forest Management Act of 1976 (P.L. 94-588) provides authority for removal of deleterious plant growth and undergrowth and provides for expenditures of funds to serve as a catalyst to encourage better management of private forests and rangelands.

Forest Service Manual 2259.03 states that "Forest officers shall cooperate fully with State, county, and Federal officials in implementing 36 CFR 222.8 and sections 1 and 2 of the Carlson-Foley Act (PL 90-583). Within budgetory constraints, the Forest Service shall control, to the extent practical, noxious farm weeds on all National Forest System lands."

The State of Montana County Noxious Weed Management Act provides for the designation of noxious weeds within the state, and directs control efforts. Provisions are also made for registration of pesticides, licensing of distributors and applicators, and enforcement of state statutes. Enforcement responsibilities for the control of noxious weeds within Montana is delegated to county commissioners through weed management district weed boards.

Specific references affecting Beaverhead National Forest involvement with district weed boards, as covered by the State of Montana County Noxious Weed Management Act is as follows:

7-22-2106 Section A(1)(c): (The Board may)...make all reasonable efforts to develop and implement a noxious weed program covering all land within the district owned or administered by a federal agency.

7-22-2107: Unlawful to permit noxious weeds to propagate. It is unlawful for any person to permit any noxious weed to propagate or go to seed on his land, except that any person who adheres to the noxious weed management program of his district or who has entered into and is in compliance with a noxious weed management agreement is considered to be in compliance with this section.

7-22-2121 Section B(3): A board may develop and carry out its noxious weed management program in cooperation with boards of other districts, with any federal governments and their agencies, or with any person within the district. The board may enter into cooperative agreements with any of these parties.

7-22-2142 (4): The commissioners may accept any private, state, or federal gifts, grants, contracts, or other funds to aid in the management of noxious weeds within the distict. These funds must be placed in the noxious weed fund.

APPENDIX D

HERBICIDE BACKGROUND STATEMENTS

The following summaries were developed from information contained in USDA Forest Service, Agriculture Handbook No. 633, "Pesticide Background Statements," Volume 1. Herbicides (USDA Forest Service, 1984). Detailed information on toxicology, environmental fate, and hazard assessment can be found in the body of the Herbicide Background Statements.

2,4-D SUMMARY

Common Name: 2,4-D

Chemical Name: (2,4-dichlorophenoxy) acetic acid

Major Forestry Applications: Conifer release, noxious weed and poisonous plant control, range improvement, right-of-way maintenance, site preparation, aquatic weed control, general weed control, thinning, timber management, wildlife habitat improvement, range management, research and engineering, recreation management, firebreak management, and nursery stand improvement.

A. General Information

The herbicidal and plant growth-regulating properties of 2,4-D were first discovered as a result of secret research during World War II (Loos 1975). Since the war, 2,4-D has become the most extensively used herbicide in forestry (Norris et al. 1983). It is one of the phenoxy herbicides marketed alone and as a combined formulation with other herbicides, including MSMA, dicamba and MCPP (Meister Publishing Company 1981).

The various commercial formulations of 2,4-D are generally either salt (amine) or ester formulations. Salt forms of 2,4-D are most readily absorbed through plant roots, whereas the ester forms are most readily absorbed through foliage. Both forms are readily translocated within the plant where the herbicide tends to accumulate at the meristematic areas of both shoots and roots. Although the primary mode of action of 2,4-D has yet to be determined, various studies have shown it to interfere with normal cell growth and to impair respiration, food reserves, and cell division (Weed Science Society of America 1983).

Since their introduction, 2,4-D and the other phenoxy herbicides have been studied and reviewed extensively in terms of toxicity and health effects, environmental fate, and mode of action. This statement does not attempt to comprehensively review all that has been written about 2,4-D, but rather, will summarize what is known about its toxicity, health effects, environmental fate, and mode of action, with emphasis on studies that have been conducted over the past two decades. Reviews of 2,4-D can be found in Norris (1981), Norris et al. (1983), Ghassemi et al. (1981), Loos (1975), Mullison (1981), Minnesota Department of Health (1978), Lommen (1980), and International Agency for Research on Cancer (1977) among others.

B. Toxicology

Toxicity of 2,4-D to aquatic organisms depends upon the specific formulation. Most ester formulations are toxic to highly toxic to aquatic invertebrates and fish, while salt and acid formulations are generally only slightly toxic to these organisms. In general, 2,4-D and its formulations have a low toxicity to birds.

Acute and chronic toxicity studies in mammals revealed gastroenteritis, skeletal and cardiac myotonia, and central nervous system depression following ingestion of large doses of 2,4-D. Similar clinical symptoms have been observed in human case reports. In mammals, 2,4-D is moderately toxic having acute oral LD_{50}'s in the range of 300 to 1,000 mg/kg except in dogs (LD_{50} = 100 mg/kg). Various salts and esters of 2,4-D are mild skin, eye, and respiratory tract irritants. In chronic toxicity studies in mammals, both the subcutaneous and oral routes of 2,4-D exposure caused adverse effects including renal gout, stomach ulcers, anemia, and death.

Although increased tumor incidences were observed in rats (treated orally with 2,4-D) and mice (treated by subcutaneous injection with the isooctyl ester of 2,4-D), because of the small number of animals tested and possibly inadequate reporting of the data, the evaluation of the carcinogenicity of 2,4-D is inconclusive. In reproduction and teratogenesis studies, decreases in birth weight, litter size, and fertility were observed; however, these adverse effects were caused by high doses that caused maternal toxicity.

Epidemiology studies have suggested an increased cancer risk in humans exposed to phenoxy acids and chlorophenols. Because of the concurrent exposure in these studies to 2,4-D and other chemicals, possibly including the contaminant 2,3,7,8-tetrachlorodibenzo-para-dioxin, the carcinogenic potential of 2,4-D alone cannot be evaluated. Generally, 2,4-D has been found to be nonmutagenic in most of the microbial systems investigated.

C. Environmental Fate

Uptake of 2,4-D by plants occurs through leaves, stems, and roots. It is translocated within the plant to regions of growth where it interferes with normal growth processes. Plants metabolize 2,4-D readily by a variety of pathways to various degradation products. Animals do not bioaccumulate 2,4-D to any great extent. The 2,4-D that is absorbed is usually eliminated very rapidly in unmetabolized form. Esters of 2,4-D, however, are usually hydrolyzed to the free acid form in animals prior to excretion.

In soils, 2,4-D generally has a short (one month or less) persistence. It tends to be mobile and is primarily degraded by microbial activity. In aquatic environments, 2,4-D is readily degraded by microbial activity, which, along with dilution, is the major means for its loss of activity in aquatic systems. Some photodegradation takes place in surface waters and highly volatile formulations vaporize to some extent.

D. Exposure and Hazard

The reported exposure levels at which toxic effects have been observed in experimental animals are considerably higher than levels anticipated for USDA Forest Service applications.

DICAMBA SUMMARY

Common Name: Dicamba

Chemical Name: 3,6-dichloro-o-anixic acid (or 2-methyl-3,6-dichlorobenzoic acid)

Major Forestry Applications: Livestock and wildlife habitat management, noxious weed control, firebreak maintenance, general weed control, thinning, and rights-of-way. Dicamba controls annual and perennial broadleaf weeds and brush species resistant to phenoxy herbicides.

A. General Information

Dicamba is a selective herbicide for both preemergence and postemergence control of perennial and annual broadleaf weeds and brush. Dicamba is absorbed rapidly by both roots and foliage, and is thus effectively applied as a ground or aerial spray and by basal application. It is also applied basally in the form of granules. Once absorbed, dicamba is readily translocated within the plant where it acts like a plant growth regulator. As such, it alters shoot and root development, resulting in leaf malformations, increased branching, and curvature of stems and leaf petioles. It also interferes with normal flowering mechanisms and results in destruction of plant cells (Frear 1975).

Dicamba is used selectively against a wide variety of broadleaf weeds and to control broadleaf weeds and brush species that are tolerant to other (phenoxy) herbicides. It is registered for use on crops such as small grains, corn, perennial seed grasses, and turf, as well as for noncrop applications. It is also useful on sorghum, pasture, sugarcane, and asparagus. On the other hand, legumes (beans and peas) are sensitive to dicamba, and conifers sprayed with dicamba are subject to top-kill and defoliation (U.S. Department of Agriculture 1978 and Weed Science Society of America 1983).

Due to its high phytotoxicity to conifers, forest timber management applications are primarily for site prepartion. Other forestry applications include livestock and wildlife habitat management, noxious weed control, nursery applications, and firebreak maintenance (Gross 1983 and Ghassemi et al. 1981). Rates of dicamba application in the Intermountain Region are usually at .25 lbs. acid equivalent per acre, mixed with 2,4-D. Application rates for dicamba as reported in Weed Science Society of America (1983) are as follows: 0.5 lb/acre (0.6 kg/ha) for preemergence; 0.06 to 0.25 lb/acre (0.07 to 0.3 kg/ha) for foliar spray on broadleaf annuals; and 0.5 to 10 lbs/acre (0.6 to 11.2 kg/ha) for foliar spray on broadleaf perennials and brush.

B. Toxicology

Dicamba is generally nontoxic to a wide variety of nontarget organisms. Studies with invertebrates and microorganisms show, in general, median lethal concentrations in excess of 100 ppm. It is only slightly toxic in fish and amphibians with LC_{50}'s in excess of 10 ppm. Acute oral toxicities in birds were equal to or greater than 673 mg/kg body weight.

In experimental studies with mammals, dicamba was a mild skin irritant and moderate skin sensitizer. Direct application of dicamba caused transient low grade eye irritation. The inhalation toxicity of dicamba was very low. Acute and subschornic ingestion of dicamba in laboratory animals resulted in slight toxicity. In isolated case reports, oral ingestion of dicamba by sheep caused death. Chronic consumption of dicamba in the diet by rats and goats for two years elicited no adverse health effects, but chronic consumption by mice caused decreased body weight and increased liver weight. In rats, dicamba caused no reproductive or teratogenic effects. In rabbits, dicamba caused post-implanation losses, a decreased number of live fetuses, and decreased fetal weights. Dicamba is not considered to be mutagenic.

C. Environmental Fate

Dicamba is taken up by both roots and leaves of plants and translocated, generally to leafy tissue, or exuded by leaves and roots. Dicamba is readily metabolized in some plant species. It does not bioaccumulate to any appreciable extent in animals, from which it is rapidly excreted in the urine either as a metabolite or as parent dicamba.

Dicamba is moderately persistent in soil and water. It does not adsorb readily to soil particles and is highly mobile. It is primarily lost from soil and water by microbial decomposition.

D. Exposure and Hazard

There should be no significant potential for adverse reproductive, mutagenic, or carcinogenic effects to individuals from dicamba at levels of application used by the USDA Forest Service if proper care is taken during application. Dicamba is mildly irritating to the eye and to the skin.

PICLORAM SUMMARY

Common Name: Picloram

Chemical Name: 4-amino-3,5,6-trichloropicolinic acid

Major Forestry Applications: Rangeland management and noxious weed control, site preparation, precommercial thinning, and conifer release.

A. General Information

Picloram is a wide-spectrum herbicide to effectively control a variety of woody plants and annual and perennial broadleaved weeds. Although the precise mode of herbicidal action of picloram has not been determined, it is known to function as a plant growth regulator. Picloram is absorbed by plant roots and foliage, is translocated throughout the plant, and is accumulated at sites of new growth (Kearney and Kaufman 1975 and Witt and Baumgartner 1979).

B. Toxicology

Picloram and its salts are low in toxicity to most nontarget organisms. Picloram is relatively nontoxic to soil microorganisms at concentrations up to 1,000 ppm. For most species of fish, picloram formulations are only slightly toxic with median lethal concentrations of greater than 10 ppm. The acute toxicity for birds is greater than 2,000 mg/kg. In subchronic feeding studies, with birds, the LC_{50} is greater than 5,000 ppm.

In studies with experimental and farm animals, the acute toxicity ranged from 8,200 mg/kg in rats to greater than 950 mg/kg in cattle. Tests with rabbits indicate that picloram is not likely to be absorbed through the skin. The LD_{50} in dermal toxicity tests with rabbits is greater than 4,000 mg/kg. Although it is a mild skin irritant in rabbits, patch tests show that it does not sensitize the skin of humans. Rats, exposed to a saturated atmosphere of picloram formulation for seven hours, showed no significant adverse effects indicating that inhalation of picloram is not likely to cause illness. Since picloram induces only moderate eye irritation in rabbits, which heals readily, it is not likely to cause injury to the cornea or blindness. Long-term studies in rats and dogs showed no observable adverse effects when doses of up to 150 mg picloram/kg body weight were fed for two years. Studies in rats and mice showed that picloram is nonteratogenic even at doses toxic to the pregnant animals, and has little or no effect on fertility, reproduction, or development of offspring. Picloram was generally found to be nonmutagenic and noncytogenetic. It appears to present little or no carcinogenic risk, although bioassays on mice and rats suggested the ability to induce benign liver tumors in rats.

C. Environmental Fate

Picloram is readily absorbed by plant roots and translocated throughout plant tissues. It is particularly prone to accumulate in new plant growth, where it is quite stable and remains largely intact. In animals, picloram does not bioaccumulate. Picloram that is ingested by animals is rapidly excreted unchanged, primarily in the urine.

Picloram is moderately to highly persistent in soil, with a half-life of approximately one month under highly favorable conditions of moisture, temperature, and organic conditions and a half-life of more than four years in arid regions. It is a relatively mobile herbicide. The potassium salt and acid formulations of picloram are easily leached from the soil. Picloram, especially in salt formulations, is water soluble and thus has a potential for high applications. Under such conditions, concentrations of 400 to 800 ppb have been detected. However, studies have indicated that runoff accounts for less than three percent of the total quantity of picloram applied to soil.

D. Exposure and Hazard

Esitmated occupational environmental exposures to picloram from normal use are well below those levels that would be expected to have acute or chronic toxic effects or reproductive effects. Picloram has not been shown to be mutagenic or carcinogenic at exposures well in excess of those to which forest workers, visitors, and animal residents would be exposed.

APPENDIX E

PROJECT DESIGN

Pretreatment Surveys

Pretreatment surveys will be conducted for each site requiring noxious weed treatment. Documentation of the following information is required as a minimum when conducting pretreatment weed management field surveys.

1. Management program/objective for the site (see Forest Land Mgmt. Plan).
2. Special considerations for the involved site (i.e., plants of special concern, presence of live water, wilderness, developed campsite, new treatment or retreatment, etc.)
3. Recommended treatment methods (combinations).
4. If chemical pesticides are recommended, the following additional information is required:
    a) Herbicide, application rate, carrier.
    b) Posting requirements.
    c) Positive placement techniques planned to minimize drift and effects on nontarget areas.
    d) Method of application.
    e) Special restrictions on the herbicide label concerning handling, bufferstrips, grazing, planting, wind speed, and droplet size.
    f) Monitoring needs.
    g) Timing of herbicide applications to avoid nesting, spawning, and calving period, or other sensitive periods in the life histories of species of high interest or special concern.

Buffer Strips

If needed, buffer strips will be identified and maintained between live water and chemical application.

Groundwater

Site specific environmental analyses will be conducted before herbicide application projects are conducted. These will identify sensitive areas where herbicides could be introduced into groundwater recharge areas. These areas will receive special mitigation (e.g., use chemical that is relatively non-mobile in the soil), or no treatment at all.

Application Requirements

The herbicides used in the EIS area will be applied by appropriately trained personnel.

1. Supervisors for herbicide application will require that the water intake system for mixing be arranged so that an air gap or reservoir will be placed between the live water intake and the mixing tank to prevent any backflow of chemical into the water source.

2. Applicators will not wash out containers or tanks in or near streams or dispose of chemical containers on the treatment area. Chemical containers will be triple rinsed (with water used in treatment program) and will be ventilated to prevent use for other purposes.

3. Herbicides will be mixed and loaded in an area where an accidental spill cannot flow into a stream or water body, or contaminate groundwater.

4. Herbicides will not be applied to paved roads.

5. Label directions will be followed instead of the above requirements if they are more restrictive, or if the directions prescribe different conditions of use. Low volatile formulations of phenoxy herbicides will be used to reduce the potential for off-site contamination.

6. During application, weather conditions will be measured hourly by trained personnel at spray sites. More measurements will be taken whenever a weather change appears to have the potential to jeopardize safe placement of the spray on the target area.

7. For all herbicide application personnel, a safety and health hazard analysis covering the mixing, transporting, application, storage, and disposal of herbicides, as well as personal behavior when handling herbicides, will be completed.

8. On herbicide application projects, a licensed applicator (certified) employee will monitor and supervise the project. Should contractors be used, they will be licensed according to State and Federal law. A Forest Service project inspector will ensure compliance with contract requirements.

9. Buffer strips or no-spray areas will be determined by local Forest Service offices. Buffer strips may also be designated by the contracting officer's representative (COR) or the project inspector during operations as a means to protect rare plants, critical riparian areas, and other sensitive areas.

10. Recommended application rates would not be exceeded when applying herbicides. Repeat applications according to site specific needs may be done in accordance with label requirements.

Water Monitoring

To determine the effectiveness of buffer strips and administrative controls in reducing impacts on water quality and the aquatic environment, the Forest Service may determine the need to monitor water quality as appropriate to the actions implemented. When an annual spray program is developed, each District will determine the location of streams and areas that might require special attention, such as domestic water supplies. The District will then use this information in establishing sampling areas. When reviewing the locations of planned herbicide treatments, the District will evaluate monitoring needs, select appropriate sites, and establish the monitoring schedule as needed, with the assistance of appropriate specialists.

APPENDIX F

SUSCEPTIBILITY OF PRIMARY TARGET PLANTS TO CONTROL BY 2,4-D, DICAMBA, and PICLORAM HERBICIDES

(Compiled from Klingman and others 1983, and personal communication with Intermountain Region Herbicide Specialist William Davis, as designated by an asterisk.)

A. Susceptibility Chart

The table in Appendix F lists the effects of phenoxy and some other systemic herbicides when applied as sprays on the foliage of primary target plants plant species. These comparisons are based on an application rate of 1 pound active ingredient per acre for 2,4-D, dicamba, and picloram.

The control ratings for the herbicides are as follows:

Excellent (E). Over 95 percent of the plant species population is killed by a single treatment. Plant is highly susceptible to the chemical.

Good (G). One treatment per year maintains 85 to 94 percent suppression of top growth, or more than 95 percent of the plant species population is killed by two or three treatments. Plant is susceptible to the chemical.

Poor (P). From 10 to 59 percent of the plant species population is killed by one treatment, or two or three treatments per year maintain 60-84 percent suppression of top growth. Plant is moderately resistant to the chemical.

None (N). Little or no effect is gained from treatments. Plant is resistant to the chemical.

Insufficient Data (I). Insufficient data exist to determine effectiveness.

The types of plants are shown as follows:

A = Annual
PN = Perennial
B = Bienniel
W = Woody

This table is to be considered as a reference as to the susceptibility of the herbicides considered for use in this EIS.

Most plants, once they have become established, require more than one treatment, if the desire is to eradicate or establish an economic control level of the plant. Difference in herbicide residual is an important factor in determining the rate of application, period of time of treatment, and number of applications of herbicides required to eradicate or control the plant.

Plant Name	Type of Plant	2,4-D	Dicamba	Picloram
Noxious Weeds				
*Black henbane (*Hyoscyamus niger*)	B	G	G	G
Canada thistle (*Cirsium arvense*)	PN	F	*I	*G
Dalmation toadflax (*Linaria dalmatica*)	PN	F	G	G
Giant (tall) whitetop (*Lepidium latifolium*)	PN	F	G	F
Leafy spurge (*Euphorbia esula*)	PN	P	F	G
*Musk thistle (*Carduus theormeri*)	B	E	G	E
Spotted knapweed (*Centaurea maculosa*)	PN	F	I	E

Plant Name	Type of Plant	2,4-D	Dicamba	Picloram
Poisonous Plants				
Tall Larkspur (*Delphinium spp.*	PN	N	1	1
Undesirable Plants				
Mules Ear (Wyethia spp.)	PN	G	1	I

HERBICIDE APPLICATION PROJECT INFORMATION

APPLICATOR'S NAME	LAST:	FIRST:	
LICENSE NUMBER			
OPERATOR'S NAME(S)			
DATE OF APPLICATION	MO. DAY YEAR	TARGET SPECIE	
TIME OF APPLICATION	START FINISH	DEVELOPMENT STAGE	
LOCATION	MAP UNIT # T R S	AIR TEMPERATURE	
COUNTY		WIND SPEED & WIND DIRECTION	
SITE DESCRIPTION		RELATIVE HUMIDITY	
RETREATMENT (Y/N)		LAST PRECIPITATION	
NEW INFESTATION (Y/N)	# OF ACRES	FORECAST	
CAUSE OF INFESTATION:			
BIOLOGICAL SURVEY (Y/N)	BIOLOGICAL AGENTS:		
PRETREATMENT REMARKS			

	PESTICIDES USED	
COMPANY NAME		
TRADE NAME		
FORMULATION TYPE		
APPLICATION RATE		
NET ACRES TREATED		
EQUIPMENT USED		
DEPARTURE TIME		
GENERAL COMMENTS		

INSTRUCTIONS

FILL OUT APPLICABLE INFORMATION

Map Unit #: This is a four digit number (the 1st digit is the GDA #, the 2nd digit is the Ranger District #, the 3rd digit is the assigned compartment #, the 4th digit is the assigned subcompartment letter.

Site Description: Ex. - Row, rangeland, MINING OP.

Pre-inventory Remarks: include such items as no risks involved, distaance from water, T & E species present, buffer strips needed, soils, etc.

Cause: Natural dispersal, vehicle dispersal, livestock dispersal, and disturbing activity, etc.

Equipment used: Micron herbie, back pack pump, truck w/handheld sprayer, truck w/boom, etc.

Forecast: i.e. thunderstorms, cumulus clouds, dry, continued dry w/little chance of rain.

Departure time: ________, & why - threat of rain, increased winds etc.

Appendix H

APPENDIX H

MONTANA NATURAL HERITAGE PROGRAM

TED SCHWINDEN, GOVERNOR
MONTANA STATE LIBRARY BUILDING

STATE OF MONTANA

1515 EAST 6TH AVENUE
HELENA, MONTANA 59620
(406) 444-3009

3 March 1986

Ceci McNicoll
Beaverhead National Forest
P.O. Box 1258
Dillon, MT 59725

Dear Ceci:

Please find enclosed information which you requested regarding sensitive plant species on the Beaverhead National Forest. I have included printouts of four Element Occurrence Records from our new data base, representing sensitive plant populations which occur on or very near Beaverhead N.F. land. In addition, I am enclosing a copy of the rare plant information which was submitted by Joan Bird (TNC Field Office, Helena) as part of a set of comments on the Forest Plan; the same populations are discussed, as well as species and populations potentially occurring on the Beaverhead. Also enclosed are the pertinent pages from the monograph by Lesica et al. (Vascular Plants of Limited Distribution in Montana), and a copy of the preliminary list of plant species of special concern which I have drawn up for the new Natural Heritage Program.

There are some ambiguities in the existing locational data for Penstemon lemhiensis, as accurate site maps were not completed during the original work done on the species in 1983; in some cases, written descriptions do not match legal descriptions. The site northwest of Argenta may occur wholly or partially on a private inholding. Also, the Badger Pass legal location is actually T7S, R11W, S22, SE 1/4; this is, however, on BLM land, as indicated in the Plan comments; the legal I gave you on the phone (S9) is erroneous. Field surveys would be needed to verify the presence (or absence) of P. lemhiensis right at Badger Pass. There is a definite need for accurate field surveys for this species; I have decided, however, to provide you with the data that currently is available, despite possible location problems.

Mike Hillis (Missoula office) has asked me to inform you of a pending Memorandum of Understanding to be established between the Heritage Program and the USFS (and other federal agencies). This will be the basis for a yearly contract arrangement, under which the USFS will purchase annual printouts of sensitive species data from the program, as well as information for individual projects. In the future, similar requests will fall under this MOU.

I am sure you are aware of the need for additional field surveys for sensitive plant species, not only on the Beaverhead N.F., but throughout Montana. Hopefully, the enclosed information will help indicate which species are to be expected on N.F. land in your area.

Please do not hesitate to call if you have any questions. Thank you for your interest in the new Natural Heritage Program.

Sincerely,

Steve Shelly

J. Stephen Shelly
Botanist

RARE PLANTS ON THE BEAVERHEAD NATIONAL FOREST

1. Penstemon lemhiensis (Lemhi beardtongue) G3/S2

Status: Listed by The Nature Conservancy as globally threatened and endangered in Montana. Candidate for federal listing (USFWS Category 2). Recommended for threatened status by Montana Rare Plant Project. This regional endemic is known from five sites in Beaverhead and Ravalli County in Montana, and 14 sites in Idaho. Only one of the Montana sites, on The Big Hole Battlefield, is protected.

very common in Idaho, esp [illegible] [illegible] N.F.

Location: Pioneer Planning Unit (GDA-2G)
Near the junction of Black Mountain Road (2400) and Kearn's Creek on rocky south-facing sagebrush slopes. There is a small private inholding at this junction, and it is not possible to determine from the record whether the occurrence is on private or public land. (T6S, R11W, S15). Also, close to the BNF on private land near Lemhi Pass (T10S, R15W, S15) and on BLM land near Badger Pass (~~T7S~~ T7S, R11W, ~~S9~~ S22). (Near West Big Hole Planning Unit).

Habitat: Relatively steep sagebrush slopes, roadcuts and ditchbanks. Often occupies areas with a high percentage of bare ground. Site elevations from 6300' to 7140' in Montana. Although dependent on naturally disturbed sites, such as steep surfaces with soil slippage, it does not inhabit otherwise optimal slopes which are heavily grazed. The species is highly palatable to both livestock and ungulates.

Recommendation for Management: If the Kearn's Creek site is on the Beaverhead National Forest, we would like to see some protection for this population. Presently the proposed management for this area in the Beaverhead N.F. plan is high intensity range (MA 22), which could result in loss of the population. We would suggest that you monitor this site, lower the intensity of range management, and consider Special Interest Area designation if grazing is reducing the population.

2. Saxifraga tempestiva (Storm saxifrage) ~~G3/S3~~ G2/S2

Status: Listed by The Nature Conservancy as threatened globally and in Montana. Listed as "rare" by the Montana Rare Plant Project. Montana endemic found only in Deer Lodge, Beaverhead, Granite, Ravalli, and possibly Powell County. Recently described species in a difficult genus.

Location: West Big Hole Unit (6DA - 1A)
a) Anaconda-Pintlar Wilderness near East Pintlar Peak(T2N,R15W, S8)

b) Pioneer Planning Unit (GDA 2F)- Near Waukena Lake (T3S, R11W, S28)

Habitat: Moist (vernally) often gravelly soil of gentle slopes and rock ledges near or above timberline in the Flint Creek, Anaconda, Bitterroot, and Pioneer Mtns.

No treatment anticipated [illegible] this [illegible]

Recommendation for Management: The proposed management for both sites (MA-9) will afford adequate protection for these populations.

3. Haplopappus macronema (Discoid goldenweed) G4/S1

Status: Listed by The Nature Conservancy as apparently globally secure but critically endangered in Montana. Listed as "rare" by the Montana rare plant project. Peripheral.

No treatment planned near Storm Park

Location: Pioneer Planning Unit (GDA-2H)
Vicinity of Storm Park (T3S, R10W, S27) Herbarium voucher dates 1920. Not field checked.

Habitat: Open, often rocky slopes at mid-to-high elevation in the mountains.

Recommendation for Management: Determine present status. Proposed management (MA-30) may not pose a threat, but the population status should be monitored.

There are two other species which the Nature Conservacny ranks as globally and state endangered which occur near the Beaverhead National Forest. There is a high likelihood that they are also found within the BNF but we know of no specific sites at this time.

1. Astragalus scaphoides (Bitterroot milkvetch) G2/S1

Location: Between Bannock and Clark Canyon Reservoir ← well below Forest elevations.
Habitat: Sagebruch grasslands at low elevations

2. Sausserea weberi (Sausserea) ~~G2~~ G4/S1

← Need to watch for No Alpine Meadows will be treated.

Location: Deer Lodge N.F. close to Beaverhead boundary (T4N, R14W, S36)
Habitat: Alpine meadows

APPENDIX I

1985 Inventoried Noxious Weed Infestations

Compartments: Map reference. First number = Land Management Plan Geographical Display Area; Second number = District; Third number references a general infestation, letter references a specific infestation.

County: 1 = Beaverhead; 23 = Deerlodge; 57 = Madison; 93 = Silverbow

Species: 1 = Leafy Spurge; 2 = Canadian Thistle; 4 = Spotted Knapweed; 7 = Whitetop; 11 = Houndstongue; 12 = Musk Thistle

Density: S = Scattered (less than 1% crown cover)
L = Low (1-10% crown cover)
M = Moderate (11-25% crown cover)
H = Heavy (over 25% crown cover)

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
2-1-7-A	1	4	S	1	Mine above Browns Lk in Rock Ck
2-1-5-A	1	4	M	1	Jeep trail in Sassman Gulch
2-1-5-B	1	4	M	1	Jeep trail Jacque Gulch
2-1-5-C	1	4	S	1	Lost Ck Rd
2-1-5-D	1	4	S	1	Mining Rd Sugar Loaf Mtn
2-1-6-A	1	4	S	1	Goarge Ck Rd
2-1-4-A	1	1	H	1	Barbour Gulch Draw Bottom
2-1-3-A	1	4	S	1	Birch Ck Rd
2-1-3-B	1	4	S	1	Birch Ck Rd
2-1-3-C	1	4	M	1	Farlin Smelter site
2-1-3-D	1	4	M	1	Farlin Historical Site parking lot
2-1-3-E	1	4	M	5	CCC Camp -WMC site
2-1-3-F	1	2	M	1	Thief Ck Rd
2-1-2-A	1	4	M	1	Dutchman Mtn Rd near Forest Bndry above Meine Camp
2-1-2-B	1	4	S	1	Jeep trail in Long John Gulch
2-1-1-A	1	4	L	1	Rattlesnake Rd
2-1-1-B	1	4	S	1	Legal Tender Mine dump
2-1-1-C	1	4	M	1	Rattlesnake Rd near jnct Clark's Gulch
2-1-1-D	1	4	S	1	Rattlesnake Rd
2-1-1-E	1	11	S	1	Rattlesnake Rd
2-1-1-F	1	4	S	1	French Ck Rd - Rattlesnake drainage
2-1-1-G	1	4	S	1	French Ck Rd - Rattlesnake drainage
2-1-1-H	1	11	S	1	French Ck Rd - Rattlesnake drainage
2-1-1-I	1	11	S	1	French Ck Rd - Rattlesnake drainage
2-1-1-J	1	11	S	1	French Ck Rd - Rattlesnake drainage
2-1-1-K	1	4	S	1	Kelly Reservoir Rd
1-1-4-A	1	2	M	1	Carol Hill Timber Sale Rd
1-1-4-B1	1	4	S	5	Carol Hill Timber Sale Rd
1-1-4-B2	1	12	S	5	Carol Hill Timber Sale Rd
1-1-4-C	1	12	S	1	Carol Hill Timber Sale Rd
1-1-4-D	1	12	S	1	Carol Hill Timber Sale Rd

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
1-1-4-E	1	4	S	5	Carol Hill Timber Sale Rd
1-1-4-F	1	4	S	1	Carol Hill Timber Sale Rd
1-1-4-G	1	15	S	1	Carol Hill Timber Sale (1 plant)
1-1-3-A	1	4	L	1	Jeep trail N of Swamp Ck
1-1-2-A	1	4	S	1	Coyote Ck Timber Sale Rd
1-1-2-B	1	2	S	1	Coyote Ck Timber Sale Rd
1-1-2-C	1	4	S	1	Coyote Ck Timber Sale
1-1-1-A	1	4	S	1	Jeep Trail in Hopps Ck
1-1-2-D	1	4	M	1	Coyote Ck Timber Sale
1-1-1-B	1	4	S	1	Jeep Trail Hopps Ck
5-1-8-A	1	4	S	1	BLM spreading from Black Canyon Rd
5-1-7-A	1	4	S	1	Jeep Trail
5-1-6-A	1	4	S	1	Kate Ck Rd
5-1-5-A	1	4	L	1	Littlewater Driveway Rd
5-1-5-B	1	2	L	5	Littlewater Driveway Rd
5-1-4-A	1	4	S	1	Nicolia Ck Rd
5-1-3-A	1	11	M	1	Deadwood Rd
5-1-3-B	1	4	S	1	Deadwood Rd
5-1-2-A	1	4	S	1	White Pine Ridge Rd
5-1-2-B	1	4	S	1	Chute Canyon Rd
5-1-2-C	1	4	M	5	Chute Canyon Rd
5-1-1-A	1	11	M	1	Little Sheep Rd
5-1-1-B	1	11	M	1	Little Sheep Rd
5-1-1-C	1	11	M	1	E Fk Little Sheep Rd
5-1-1-D	1	2	M	1	E Fk Little Sheep Rd
5-1-1-E	1	11	S	1	M Fk Little Sheep Rd
5-1-1-F	1	11	S	1	Little Sheep Rd
5-1-1-G	1	11	M	5	Jnct E Fk & M Fk Little Sheep Ck Rd
5-1-1-H	1	11	M	5	Little Sheep Rd
5-1-1-I	1	11	S	1	W Fk Little Sheep Rd
5-1-1-J	1	11	S	1	W Fk Little Sheep Rd
5-1-1-K	1	4	S	1	White Pine Ridge Rd
5-1-1-L	1	11	S	1	White Pine Ridge Rd
5-1-1-M	1	4	S	1	White Pine Ridge Rd
1-1-2-A1	1	12	S	1	Coyote Ck Timber Sale Rd
2-1-2-A1	1	12	S	1	Coyote Ck T.S. Rd
2-1-1-L	1	11	S	1	Rattlesnake to Badger Pass Rd

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
1-2-1-A	23	2	L	10	Carrol Ck Rd
1-2-2-A	23	2	S	50	Clearcut W Slaughterhouse Cr
1-2-3-A	23	4	S	1	W Fk Twelvemile Rd
1-2-4-A	23	2	S	1	Rd Carrol Ck area
1-2-4-B	23	4	L	1	Rd Carrol Ck area
1-2-5-A	23	4	S	1	Rd W Fk Twelvemile area
1-2-6-A	23	4	S	4	1/2 mi road W Sullivan Cr
3-2-1-A	23	2	L	1	Moose Cr Rd
3-2-2-B	23	12	L	1	Moose Ck Rd before closure
3-2-2-A	23	2	L	1	Moose Ck Rd above closure
1-2-9-B	23	4	S	1	Dry Ck Rd
1-2-7-B	23	2	S	1	Upper Dry Ck Rd
1-2-7-C	23	2	S	1	Upper Dry Ck Rd
1-2-7-D	23	4	S	1	Rd Bear Trap Gulch area
1-2-7-E	23	2	L	3	Rd Bear Trap Gulch area
1-2-10-A	23	2	L	3	1 mi rd W of Seymour Ck
1-2-9-A	23	2	S	1	1/2 mi rd E of Seymour Ck
1-2-7-A	23	4	S	1	Rd Upper Bear Trap Gulch
1-2-8-A	23	2	L	23	Clearcut in Dry CK area
1-2-11-B	23	2	L	3	1 mi road W of Seymour Ck
1-2-11-B2	23	4	L	3	1 mi rd W of Seymour Ck
1-2-11-C	23	2	S	3	1-1/2 mi road W of Arcola Boy Scout Camp
1-2-12-C	23	2	S	1	E Fk LaMarche Ck Rd
1-2-12-B	23	2	S	1	E Fk LaMarche Ck Rd
1-2-12-A	23	2	S	1	E Fk LaMarche Ck Rd
1-2-13-B	23	2	S	1	Rd S of Arcola Boy Scout Camp
1-2-13-A	23	4	S	1	Rd S Arcola Boy Scout Camp
1-2-14-A	23	2	L	1	Trail N of LaMarche Ck Rnch
1-2-15-A	23	2	L	2	Rd near Calvert Ck
1-2-15-B	23	4	L	1	Northside Rd - W Fk Fishtrap Ck area
1-2-15-C	23	2	L	1	Northside Rd - W Fk Fishtrap Ck area
1-2-15-D	23	2	L	1	Northside Rd
1-2-15-E	23	4	L	1	Northside Rd
1-2-15-F	23	4	L	1	End Northside Rd
1-2-17-A	23	4	L	1	Pintler Ck Rd at trailhead
1-2-16-A	23	2	L	1	York Gulch Rd
1-2-16-B	23	4	L	1	York Gulch Rd
3-2-3-A	93	2	L	1	Henley Ck Rd
2-2-1-A	1	18	L	10	Baby's Breath - D-2 Admin Site
2-2-1-B	1	1	L	7	D-2 Admin Site
3-2-4-A	93	4	L	1	Long Tom Rd E of Fish Lk
3-2-5-A	93	2	L	27	2 mi Upper Jerry Rd (Delano area)
3-2-6-A	93	2	L	5	2 mi Jerry Ck Rd near Parker Ck
2-2-3-A	1	4	L	1	Jackson Rd
2-2-2-A1	1	4	L	1	Quartz Hill Rd
2-2-2-A2	1	11	M	1	Quartz Hill Rd
2-2-2-B1	1	2	S	1	Quartz Hill Rd
2-2-2-B2	1	4	S	1	Quartz Hill Rd
2-2-2-B3	1	12	S	1	Quartz Hill Rd
2-2-4-A	1	2	S	2	Calvert Hill Loop Rd near Calvert Hill Mine

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
3-2-6-A	93	4	M	30	3 mi Johnson Ck Rd
2-2-5-B	1	2	L	1	Bryant Ck Rd
2-2-5-A	1	4	S	1	Bryant Ck Rd
2-2-6-A	1	12	S	1	Harriet Lou Rd and clearcut
2-2-6-B	1	2	L	1	Harriet Lou Rd and clearcut
2-2-6-C	1	4	L	1	Harriet Lou Rd
2-2-7-A	1	4	M	96	7 mi of Wise River Rd
2-2-7-B	1	4	M	1	E of Pattengail Creek on E side of Wise River Rd
2-2-8-A	1	4	L	1	Jeep trail in Pattengail Ck
2-2-7-C	1	4	M	1	E of Lodgepole Campground & Wise River Rd
2-2-9-A	1	2	L	2	Lacy Ck Rd
2-2-10-A	1	2	L	1	1/2 mi S Maurice Cenetary on Wise River Rd
2-2-11-A	1	2	S	1	Vipond Park Rd
2-2-12-A	1	12	L	1	Trapper Ck Rd in Yanks Pasture
2-2-13-A	1	4	L	1	Jeep trail on Sawmill Gulch Ridge
2-2-15-A	1	2	L	1	Jeep Rd near Lwr Cattle Gulch Spg
2-2-14-A	1	4	M	1	Rd in Trusy Gulch
2-2-14-B	1	4	S	1	Rd Electric Fence pasture
2-2-16-A	1	4	L	1	1 mi Trapper Ck Rd
2-2-17-A	1	2	L	1	Jeep Rd near Browns Gulch Spg
2-2-17-B	1	4	S	1	Rd near Browns Ck

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
1-3-10-A	1	2	S	1	Rd near Clam Valley
1-3-9-A	1	4	S	7	Rd near Howell Ck
1-3-7-B	1	2	L	20	Lower Bender clearcuts
1-3-7-A	1	12	L	30	Lower Bender clearcuts
1-3-8-A	1	2	L	10	Northside Rd to Bender clearcuts
1-3-8-B	1	12	L	10	Northside Rd to Bender clearcuts
1-3-6-A	1	2	M	4	3 mi of rd to Mussigbrod Lk
1-3-6-B	1	12	M	4	3 mi of rd to Mussigbrod Lk
1-3-6-C	1	4	S	1	Mussigbrod Rd
1-3-2-A	1	2	M	6	Placer Ck-Johnson Ck Rd
1-3-2-B	1	4	L	2	Placer Ck-Johnson Ck Rd
1-3-3-A	1	2	L	40	Clearcut N of Tie Ck
1-3-3-B	1	12	M	40	Clearcuts N of Tie Ck
1-3-4-B	1	2	L	2	Rd in Johnson Ck
1-3-4-A	1	2	M	5	Rd in Johnson Ck
1-3-15-A	1	2	S	12	1 mi of Doolittle Ck Rd
1-3-16-A	1	4	H	70	Hwy 43
1-3-2-B	1	4	L	5	Placer Ck-Johnson Rd
1-3-2-A	1	2	M	5	Rd near Cox Ck E of Clemow Cow Camp
1-3-1-A	1	2	M	5	Butler Ck Rd
1-3-1-B	1	2	M	5	Butler Ck Rd
1-3-1-C	1	12	M	5	Butler Ck Rd
1-3-1-D	1	2	M	25	Butler Ck Rd
1-3-1-H	1	12	M	25	Butler Ck Rd
1-3-1-E	1	12	S	1	Rd S of Trail Ck
1-3-1-F	1	4	S	5	Rd S of Trail Ck
1-3-1-G	1	4	M	1	Rd S of Trail Ck
1-3-17-A	1	2	L	1	Trail Ck Rd
1-3-17-B	1	12	L	1	Trail Ck Rd
1-3-16-A	1	4	H	20	Hwy 43 near Chief Joseph Pass
1-3-15-A	1	2	M	10	Trail Ck Rd
1-3-15-B	1	12	M	10	Trail Ck Rd
1-3-14-A	1	2	M	5	Rd in Butler-Ruby-Sawpit area
1-3-14-B	1	12	M	5	Rd in Butler-Ruby-Sawpit area
1-3-14-C	1	4	M	1	Rd in Butler-Ruby-Sawpit area
1-3-14-D	1	2	M	5	Rd in Butler-Ruby-Sawpit area
1-3-14-E	1	4	L	1	Rd in Butler-Ruby-Sawpit area
1-3-13-A	1	4	M	25	Sawpit clearcut
1-3-13-B	1	2	M	40	Sawpit clearcut
1-3-13-C	1	12	M	40	Sawpit clearcut
1-3-13-D	1	11	M	7	Sawpit clearcut
1-3-13-E	1	4	M	1	1 mi of rd to Sawpit clearcut
1-3-12-A	1	2	L	5	Rd in Butler Ck area
1-3-12-B	1	12	L	5	Rd in Butler Ck area
1-3-12-C	1	4	L	5	Rd in Butler Ck area
1-3-12-D	1	4	L	5	Rd in Butler Ck area
1-3-12-E	1	4	M	5	Rd in Butler Ck area
1-3-11-A	1	4	H	50	Butler clearcuts
1-3-11-B	1	11	M	5	Butler clearcuts

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
1-3-30-A	1	2	M	20	3 mi of rd near Big Moosehorn Ck
1-3-30-B	1	12	M	20	3 mi of rd near Big Moosehorn Ck
1-3-30-C	1	4	L	1	3 mi of rd near Big Moosehorn Ck
1-3-28-A	1	4	M	1	Rd in Ruby Ck
1-3-28-B	1	2	L	5	Rd near Isaac Meadows
1-3-28-C	1	12	L	5	Rd near Isaac Meadows
1-3-29-A	1	2	L	1	1 mi rd along Ruby Ck near Wagner Gulch
1-3-31-A	1	2	S	1	Rd near Yank Swamp
1-3-15-A	1	2	S	5	Trail Ck Rd
2-3-1-A	1	2	L	5	1-1/2 mi Steel Ck Rd
2-3-2-A	1	2	S	1	Rd near Cox Ck E of Clemow Cow Camp
2-3-1-A	1	2	L	5	
2-3-3-A	1	2	L	1	Rd S of Clemow Cow Camp
2-3-2-B	1	2	S	5	Near Clemow Cow Camp
2-3-2-C	1	12	S	5	Near Clemow Cow Camp
2-3-4-A	1	2	L	1	1 mi of rd near Milk Ck
2-3-4-B	1	4	S	1	1 mi of rd near Milk Ck
2-3-4-C	1	2	M	5	Rd in Richards Pk
2-3-4-D	1	12	M	5	Rd in Richards Pk
2-3-4-E	1	4	S	1	1 mi rd Woody Ck near Carney Mine
1-3-18-A	1	4	S	1	Skinner Meadows Rd N of Jackson Cow Camp
1-3-18-B	1	2	M	5	4 mi of Skinner Meadows Rd
1-3-18-C	1	12	M	5	4 mi Skinner Meadow Rd
1-3-19-A	1	2	S	1	1 mi rd near Miner Ck
1-3-19-A	1	2	L	1	1 mi rd near Miner Ck
1-3-19-B	1	2	M	1	1 mi rd near Miner Ck
1-3-19-C	1	4	M	1	Rd S of Miner Ck
1-3-19-D	1	4	M	5	Rd S.of Miner Ck
1-3-19-E	1	4	L	1	Rd S of Miner Ck
1-3-20-A	1	4	M	1	1 mi rd near Miner Lk Campground
1-3-20-B	1	2	M	1	1 mi rd near Miner Lk Campground
1-3-21-A	1	2	H	5	1/2 mi rd near Big Swamp Ck
1-3-21-B	1	4	L	1	1/2 mi rd near Big Swamp Ck
1-3-21-C	1	2	L	5	2 mi rd near Big Swamp Ck
1-3-21-D	1	12	L	5	2 mi rd near Big Swamp Ck
1-3-21-D	1	4	L	1	Rd near Big Swamp Ck
1-3-21-E	1	2	H	1	Rd W of Twin Lks Cow Camp
1-3-21-F	1	2	M	1	1/2 mi rd W of Twin Lks Cow Camp
1-3-21-G	1	2	M	1	1/2 mi rd W Twin Lks Cow Camp
1-3-21-H	1	2	S	1	1 mi rd W of Twin Lks Cow Camp
1-3-21-I	1	4	S	1	1 mi rd W of Twin Lakes Cow Camp
1-3-21-J	1	4	S	5	Near head Sawmill Ck
1-3-22-A	1	2	L	1	Rd 945.3 E of Twin Lks
1-3-23-A	1	4	S	5	Rd near Lake Ck
1-3-23-B	1	2	L	1	Rd near Lake Ck
1-3-24-D	1	2	M	5	Rd Pioneer Ck area
1-3-25-A	1	2	L	5	Rd Ruby Ck area
1-3-26-A	1	4	L	1	Rd Moose Ck area
1-3-26-B	1	2	L	18	Rd Moose Ck area

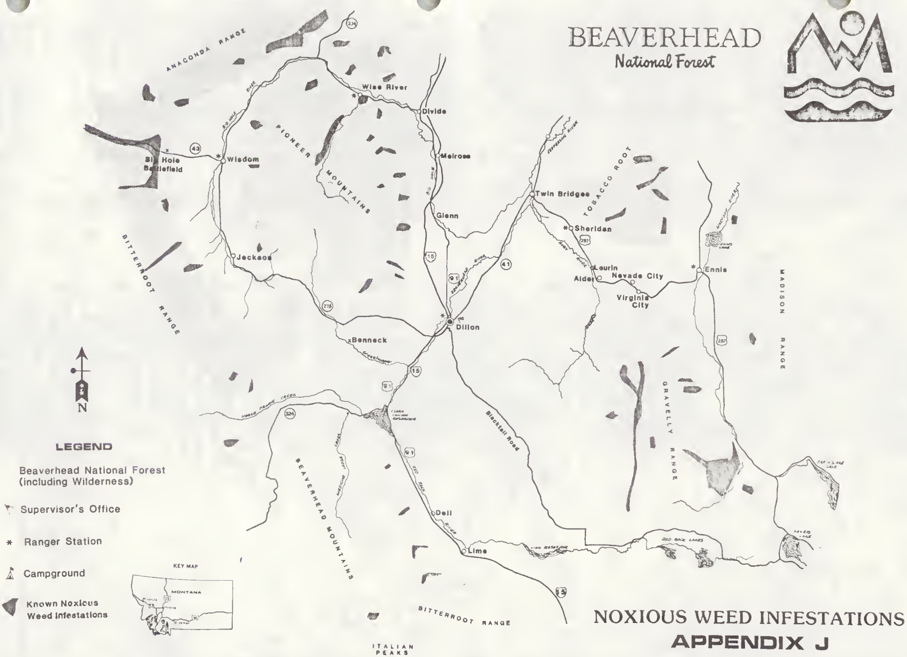
COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
1-3-26-C	1	12	L	18	Rd Moose Ck area
1-3-27-A	1	2	S	5	Rds Mifflin Ck area
1-3-27-B	1	12	S	5	Rds Mifflin Ck area
1-3-27-C	1	12	S	10	Rds Mifflin Ck area
1-3-27-D	1	2	S	10	Rds Mifflin Ck area
1-3-30-A	1	4	M	50	Gibbons Pass Fire

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
6-6-1-A	57	2	M	55	Main Ruby Ri Rd
6-6-1-B	57	11	M	55	Main Ruby Ri Rd
6-6-2-A	57	2	L	10	Timber Ck Rd - Ruby Ri drainage
6-6-2-B	57	4	L	2	Timber Ck Rd - Ruby Ri drainage
6-6-2-C	57	11	L	10	Timber Ck Rd - Ruby Ri drainage
6-6-3-A	57	2	L	10	S Fk Warm Spg Ck - Ruby Ri drainage
6-6-3-B	57	11	L	10	S Fk Warm Spg Ck - Ruby Ri drainage
6-6-4-A	57	11	L	2	Lewis Ck-Ruby Ri drainage
6-6-5-A	57	2	L	5	Cottonwood Rd-Ruby Ri drainage
6-6-5-D	57	2	H	5	Cottonwood Rd - Ruby Ri drainage
6-6-5-C	57	4	L	1	Cottonwood Rd - Ruby Ri drainage
6-6-5-B	57	11	L	5	Cottonwood Rd - Ruby Ri drainage
6-6-5-D	57	2	H	1	Cottonwood Rd - Ruby Ri drainage
6-6-6-A	57	11	L	2	Rd 1012 - Ruby Ri drainage
6-6-7-A	57	2	H	2	W Fk Ruby Ri
6-6-8-A	57	2	L	3	Rd Secs 6,7,8, T12S,R3W
6-6-8-A	57	2	L	3	Rd Secs 6,7,8, T12S,R3W
6-6-8-B	57	11	L	3	Rd Secs 6,7,8, T12S,R3W
6-6-9-A	57	2	L	100	Timber Ck Rd/Clearcuts/old logging rds.
6-6-9-B	57	4	L	100	Timber Ck Rd/clearcuts/old logging rds
6-6-9-C	57	11	L	100	Timber Ck Rd/clearcuts/old logging rds
6-6-10-A	57	4	H	35	Ice Ck - Ruby Ri drainage
6-6-10-B	57	11	M	35	Ice Ck - Ruby Ri drainage
6-6-11-A	57	11	M	7	Little Willow Ck - Ruby Ri drainage
6-6-12-B	57	2	L	2	Marlin, Morten, Squaw Cks, Ruby Ri drainage
6-6-12-C	57	2	L	2	Marlin, Morten, Squaw Cks, Ruby Ri drainage
6-6-12-D	57	2	L	2	Marlin, Morten, Squaw Cks, Ruby Ri drainage
6-6-12-A	57	11	H	5	Marlin, Morten, Squaw Cks, Ruby Ri drainage
4-6-2-A	57	2	M	5	Mill Ck Rd - Tobacco Rt Mtns
4-6-1-A	57	4	H	12	Hdwts Dry Georgia Gulch
4-6-1-B	57	4	H	13	Hdwts Dry Georgia Gulch
4-6-1-C	57	4	H	25	Hdwts Wet Georgia Gulch
6-6-15-A	57	11	H	5	Mths Cottonwood & Short Cks, Ruby Ri drainage
6-6-16-A	57	11	H	2	Lower portion E Fk Ruby Ri
6-6-19-A	57	4	M	2	Lower portion M Fk Warm Spg Ck
6-6-20-A	57	4	M	1	French Gulch - Ruby River drainage
6-6-21-A	57	11	L	1	Lower Divide Ck - Ruby Ri drainage
6-6-22-A	57	7	L	1	Elk Ck - Ruby Ri Rd
6-6-23-A	57	4	M	10	Jug Ck - Ruby Ri Rd

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
-7-	57	4	S	1	3 mi horse pasture
-7- -B	57	2	S	11	Ennis Compound
-7- -A	57	4	S	11	Ennis Compound
-7- -C	57	11	S	11	Ennis Compound
7-7- -C	57	2	S	3	Bear Ck Rngr Station
7-7- -D	57	7	S	3	Bear Ck Rngr Station
7-7- -E	57	11	S	3	Bear Ck Rngr Station
7-7-1-B	57	2	L	5	Trail Fk trail
7-7-1-A	57	4	H	4	Wilderness (L Mc) M Fk Bear Ck
7-7-2-B	57	4	H	6	Rd N Bear Ck
7-7-2-A	57	4	L	1	N. Bear Ck near L Mc Wilderness
7-7- -A	57	4	M	9	Bear Ck Rngr Station
7-7- -B	57	11	M	1	Bear Ck Rngr Station
7-7-3-A	57	2	S	3	Indian Ck Trail @ old sawmill site
7-7-4-A	57	4	S	1	Trail Ck trail
7-7-4-B	57	12	S	1	Fall Ck Trail
7-7-4-C	57	12	S	4	Fall Ck Trail
4-7-1-C	57	2	S	1	Allotmnt bndry fence Catarack Ck
4-7-1-F	57	2	S	2	Allotmnt bndry fence Cataract Ck
4-7-1-A	57	4	S	1	Allotmnt bndry fence Cataract Ck
4-7-1-D	57	12	S	1	Allotmnt bndry fence Cataract Ck
4-7-1-G	57	12	S	2	Allotmnt bndry fence Cataract Ck
4-7-1-B	57	2	L	1	Allotmnt bndry fence Cataract Ck
4-7-1-H	57	2	L	1	Allotmnt bndry fence w/Willow Ck & Strawberry Ridge Allotments
4-7-1-I	57	12	L	1	Allotmnt bndry fence w/Willow Ck & Strawberry Ridge Allotments
4-7-2-E	57	4	S	88	Entire Rd FS bndry to Camp Ck Reservoir & FS Mike Myhre
4-7-2-D	57	4	M	11	Camp Ck Reservoir area
4-7-4-A	57	2	S	72	Willow Ck Rd
4-7-4-B	57	11	S	72	Willow Ck Rd
4-7-4-C	57	12	S	72	Willow Ck Rd
4-7-2-C	57	4	S	70	Trails Rattlesnake Ck & Camp Ck Reservoir, Madison Ri drainage
4-7-2-A	57	4	L	1	Norwegian Gulch
4-7-2-B	57	4	L	1	Norwegian Gulch
4-7-3-B	57	2	S	121	Rds & Trls Sureshot Lk, Meadow Ck, Madison Ri drainage
4-7-3-A	57	4	S	1	Rds & Trls Sureshot Lk, Meadow Ck, Madison Ri drainage
4-7-3-C	57	11	S	121	Rds & Trls Sureshot Lk, Meadow Ck, Madison Ri drainage
4-7-3-D	57	12	S	121	Rds & Trls Sureshot Lk, Meadow Ck, Madison Ri drainage
4-7-5-A	57	2	S	72	Between Sawlog & Aurora Cks
4-7-5-B	57	12	S	72	Between Sawlog & Aurora Cks
4-7-6-B	57	2	S	90	Rds Dry Leonard & S Willow drainage
4-7-6-A	57	4	S	1	Rds Dry Leonard & S Willow drainage
4-7-6-C	57	11	S	90	Rd between Dry Leonard & S Willow drainage
4-7-6-D	57	12	S	90	Rd between Dry Leonard & S Willow drainage
6-7-1-A	57	2	M	5	Boat ramp & parking area Wade Lk Campground
6-7-1-B	57	4	S	5	Boat ramp & parking area Wade Lk Campground
6-7-1-C	57	11	S	5	Boat ramp & parking area Wade Lake Campground
6-7-1-D	57	2	S	78	2 mi rd Wade Lk Cpgd, Hilltop Cpdg, & Cliff Lk Cpgd
6-7-1-E	57	11	S	78	2 mi rd Wade Lk Cpgd, Hilltop Cpgd, & Cliff Lk Cpgd
6-7-1-F	57	12	S	78	2 mi rd Wade Lk Cpgd, Hilltop Cpgd, & Cliff Lk Cpgd
6-7-2-A	57	4	L	1	Rd near Hyde Ck
6-7-3-A	57	4	M	1	1/4 mi inside FS bndry between Wall Creek & irrigation ditch

COMPARTMENT	COUNTY	SPECIES	DENSITY	TOTAL ACRES	LOCATION DESCRIPTION
6-7-4-A	57	4	L	1	Old Grindstone Gulch logging rd
6-7-4-C	57	2	S	62	FS bndry on Ruby Ck up Grindstone Gulch
6-7-4-D	57	4	S	62	FS bndry on Ruby Ck up Grindstone Gulch
6-7-4-B	57	4	M	11	Old Grindstone logging rd
6-7-5-B	57	2	M	3	Johnny Gulch Rd
6-7-5-A	57	4	S	1	Johnny Gulch Rd
6-7-5-C	57	2	S	5	Johnny Gulch Rd
6-7-5-D	57	2	S	1	Johnny Gulch Rd
6-7-5-E	57	2	S	104	Johnny Gulch Rd
6-7-5-F	57	11	S	110	Rds in Upper Johnny Gulch
6-7-5-G	57	12	S	110	Rds in Upper Johnny Gulch
6-7-6-A	57	2	M	1	Call Rd, Wigwam Ck
6-7-6-B	57	12	M	23	Call Rd, Wigwam Ck
6-7-6-C	57	12	H	7	Call Rd, Wigwam Ck
6-7-6-E	57	2	S	202	Call Rd, Wigwam Ck
6-7-6-D	57	4	S	1	Call Rd, Wigwam Ck
6-7-6-F	57	11	S	202	Call Rd, Wigwam Ck
6-7-6-G	57	12	S	202	Call Rd, Wigwam Ck
6-7-7-A	57	2	S	224	E of W Fk Rd Sec 10, 34
6-7-7-F	57	4	S	1	E of W Fk Rd Sec 10,34
6-7-7-G	57	4	S	1	E of W Fk Rd Sec 10, 34
6-7-7-H	57	4	S	1	E of W Fk Rd Sec 10, 34
6-7-7-C	57	11	S	224	E of W Fk Rd Sec 10, 34
6-7-7-D	57	12	S	224	E of W Fk Rd Sec 10, 34
6-7-7-B	57	2	M	2	E of W Fk Rd, Sec 10, 34
6-7-7-E	57	4	M	1	E of W Fk Rd, Sec 10, 34
6-7-9-A	57	2	S	412	FS Rd Flatiron Mtn
6-7-9-B	57	11	S	412	FS Rd Flatiron Mtn
6-7-9-C	57	12	S	412	FS Rd Flatiron Mtn
6-7-8-A	57	2	H	2	Rd/Trl upper reaches Standard Ck
6-7-8-B	57	2	H	1	Rd/Trl upper reaches Standard Ck
6-7-8-C	57	2	H	1	Rd/Trl upper reaches Standard Ck
6-7-8-D	57	2	S	385	Rd/Trl upper reaches Standard Ck
6-7-8-E	57	11	S	293	Rd/Trl upper reaches Standard Ck
6-7-8-F	57	12	S	293	Rd/Trl upper reaches Standard Ck
6-7-10-A	57	4	H	1	FS Rd 831 & Cabin camp
6-7-10-B	57	2	L	26	FS Rd 831 & Cabin Camp
6-7-10-C	57	4	L	26	FS Rd 831 & Cabin Camp
6-7-10-D	57	2	S	54	FS Rd 831 & Cabin Camp
6-7-10-E	57	4	S	12	FS Rd 831 & Cabin Camp
6-7-10-F	57	11	S	54	FS Rd 831 & Cabin Camp
6-7-10-G	57	12	S	54	FS Rd & Cabin Camp

BEAVERHEAD National Forest



NOXIOUS WEED INFESTATIONS

APPENDIX J

APPENDIX K

HUMAN HEALTH RISK ANALYSIS FOR PROPOSED HERBICIDE SPRAY PROGRAMS TO CONTROL NOXIOUS WEEDS ON THE BEAVERHEAD NATIONAL FOREST

This analysis provides the worst-case risk to human health as a result of herbicide spray programs to control noxious weeds on the Beaverhead National Forest. The herbicide spray alternative proposes spraying the herbicides Glyphosate (Roundup, tradename) 2,4-D, dicamba (Banvel, tradename), and picloram (Tordon, tradename) onto approximately 7700 acres of rangeland and road right-of-way (ROW). These 7700 acres of noxious weeds generally contain individual plants or scattered patches, mostly along roads and trails, and in isolated timber harvest and recreation sites scattered across approximately 2.1 million acres of Beaverhead National Forest. Typically, ROW projects involve spot applications within 10 to 20 feet of a road.

Analyses of human health impacts are provided for the worst-case example of each type of project. These worst-case examples are defined on the basis of proximity to water and residents, size of the spray area, and the amount of herbicide sprayed.

Worst-case Open Range Project

The worst-case open-range project selected for analysis is the Butler-Sawpit project. This project involves spraying approximately 210 pounds of picloram and 100 pounds of 2,4-D onto 100 net acres of ground to control spotted knapweed. These 120 acres of noxious weeds are actually several infestations scattered over approximately 3,000 acres of ground. The nearest residence is a ranch home approximately two miles from an area being sprayed. The nearest water is approximately one-quarter mile.

This worst-case analysis will be based on the analysis of a 500-acre project involving the application of 450 pounds of picloram (in combination with 2,4-D). The development of the 500-acre project analysis is contained in a document in the decision file entitled "Background Document for Human Health Risk Analysis of the USDA Forest Service Program to Control Noxious Weeds in Region 1" (referred to below as the Background Document).

The analysis of a 500-acre project assumed that the spray site is continuous (i.e., not spread over a wide area) thus maximizing drift to adjacent areas. A residence is assumed to be located within 200 meters (220 yds) of the border of the nearest spray area. The residence is assumed to downwind of the spray site and the residents are assumed to be outside and exposed to drift during the entire spray period. The residents are assumed to have a vegetable garden located adjacent to the house. In addition, the residents are assumed to consume a steer which has grazed exclusively on herbicide-treated grass and accumulated the maximum body burden of the herbicide.

Based on all critical exposure parameters, the actual 100-acre Butler-Sawpit project will provide less exposure to members of the general population than that calculated for the large open-range project in the Background Document. Considerably less herbicide would be applied in the Butler-Sawpit project than is assumed in the large model project analyzed in the Background Document. The herbicide is applied on individual plants or patches scattered over a large area thus concentrated drift will not occur. The nearest residence to the Butler-Sawpit project is a ranch home 2 miles from the spray area.

In addition to resident dose values, dose values are also provided for visitors who enter the area after spraying is completed and visitors who enter the spray area and consume 0.5 pounds of vegetation that has been directly sprayed with picloram.

Table 1 provides dose values for members of the general population for the various exposure pathways of concern. As indicated on this table, the two highest doses could come from eating beef that has been fed herbicide-treated grass and from eating one-half pound of wild foods that have been directly sprayed with herbicides. Both of these worst-case dose levels are highly improbable. The highly scattered nature of the spray sites (000 acres in 3,000 acres) insures that herbicide-treated vegetation will constitute a very small portion of diet of the cattle. Consequent dose to human consumers would be much less than calculated here and probably nondetectable.

The probability of human consumption of sprayed vegetation is also very small. The isolated nature of spray sites, the absence of wild foods, and the small percentage of the area being sprayed would make doses at this level very unlikely. In addition, in concentrations above 5 parts per million (ppm) on food, picloram (and 2,4-D) impart a very bitter taste to food thus limiting intake. In contrast, a herbicide concentration of 340 ppm was assumed when calculating the dose from consuming 0.5 pound of sprayed vegetation.

In analyzing the significance of the maximum possible human dose, a comparison can be made between the worst-case predicted dose and the highest long-term dose level that caused no observed adverse impact in the most sensitive animal species dosed with this herbicide. The dose level that had no effect on the test species is usually phrased as the no observed effect level (NOEL). The comparison between the NOEL and the worst-case dose can be phrased in terms of a margin of safety. For example, a margin of safety of 641 means that the worst-case dose we can possibly expect to humans as a result of this spray project is about 641 times lower than the dose at which any effects were noted in the most sensitive animal species used in laboratory safety testing of the herbicide. This margin of safety is calculated by dividing the NOEL by the worst-case dose.

Based on a review of toxicology data provided in the Background Document, the NOEL for picloram is 7,000 micrograms/kilogram/day or 7.0 milligrams/kilogram/day.

Table 2 provides the margins of safety for maximum-exposed residents and visitors. The factors for residents assume that the resident is directly exposed to drift and indirectly exposed through consumption of garden vegetables and beef.

At present, the evidence that picloram is a carcinogen is weak and ambiguous. Nonetheless, this analysis made the worst-case assumption that picloram is a carcinogen. Table 2 provides the probability of cancer to various maximum-exposed individuals as a result of their doses. For example, the incremental probability of cancer as a result of this spray program for a maximum-exposed adult resident is 2.24×10^{-8}. This means that there is less than three chances in one hundred million that an adult would develop cancer as a result of these worst-case doses.

Workers would apply picloram both as a liquid and as solid beads. Worker exposure with liquid formulations will be much higher than exposure with beads and liquid formulations will be assumed here.

As a consequence of the dispersed nature of the spray sites, the maximum amount of herbicide applied by any worker would be about 1.5 kilograms/day. The worst-case worker dose from spraying picloram liquid formulations with backpack sprayers would be 0.35 milligram/kilogram/day. When compared to the picloram NOEL of 7 milligrams/kilogram/day, this dose has a margin of safety of 20. The cancer probability from this dose is 7.8 x 10^{-9} or about eight chances in 1 billion.

The risks from all other smaller open-range projects would be commensurately less than the risks presented in this section.

Worst-case Right-of-Way Project

Noxious weeds often spread initially along transportation corridors. As a consequence, the Forest Service contemplates spraying along road rights-of-way (ROW).

The worst-case project involving spraying a ROW would occur along the West Fork Road. This project would involve application of 10.5 pounds of 2,4-D and 3.5 pounds of dicamba along both sides of approximately 8 to 10 miles of roadway.

The risk from a ROW project involving the application of 35 pounds of 2,4-D and 24 pounds of dicamba to 5 miles of roadway (both sides) was analyzed in the Background Document. Since the project contemplated here would involve less pesticide which would be applied over a larger area, the worst-case risk factors developed for the generic project will further overestimate the actual exposure levels. See Table 3 for worse case daily dose, and Table 4 for margin of safety and cancer risk for the worse case analysis.

Worst-case estimates of dose levels have been developed for residents within 60 meters (200 feet) who are exposed directly to drift and who eat garden vegetables contaminated with drift. The dose to an adolescent who would walk within 1 yard of a spray rig during application was also calculated. The dose to a person who re-enters the spray area after spraying has occurred is also provided.

The West Fork road follows the West Fork of the Madison River with some spray areas relatively close to the river. Based on the experimental data reviewed in the Background Document, it can be assumed that a maximum of 4 percent of the applied herbicide could drift into the stream during application and a maximum of 4 percent of the applied herbicide could be washed off into the stream after a large rainstorm over an 8-hour period.

Based on a minimum summer flow of 20 cfs and a total application of 4.8 kg (10.5 lb) of 2,4-D and 1.6 kg (3.5 lb) of dicamba, the concentrations in the stream over the 8-hour period would be 1.17 x 10^{-3} mg/liter of 2,4-D and 3.9 x 10^{-4} mg/liter for dicamba. Possible human health impacts of aquatic contamination will be discussed below.

On the assumption that two workers with hand sprayers could cover the project in a day, each worker would apply about 2.4 kg (5 lbs) of 2,4-D and 0.8 kg (1.75 lbs) of dicamba. Worker dose would be 0.56 mg/kg for 2,4-D and 0.37 mg/kg for dicamba. Margins of safety would be 21 for 2,4-D and 3.4 for dicamba. Cancer probability would be 1.1 x 10^{-7}.

Aquatic Contamination Analysis of the West Fork Project

Assuming that a maximum of 4 percent of the applied herbicide could runoff into the river in any one 8-hour period (based on data from the Background Document), and assuming a summer low flow of 20 cfs (from USGS flow data), the concentration of 2,4-D and dicamba in the river would be 0.132 ppm and 0.066 ppm, respectively.

Doses, margins of safety, and cancer probabilities to a 70 kg adult, a 40 kg adolescent and a 12 kg infant drinking 2 liters, 1.2 liters, and 0.75 liters of water, respectively, are given in Table 5. Assuming very conservative (high) bioconcentration factors of 1.0 for the herbicides, the doses to adults, adolescents, and infants consuming 0.5 kg (1.1 lbs), 0.3 kg, and 0.1 kg of fish are also provided in Table 5.

Major Accidents

The effect of a major truck spill of 300 gallons of herbicide mix containing 22 pounds active ingredient of herbicide into various drinking water reservoirs is discussed in the Background Document. The spray programs in the Beaverhead NF will not involve spraying near drinking water sources or travel along streams used as drinking water sources. However, the worst-case spill scenario in the Background Document indicates the effect of a major spill into small stream (1.5 cfs) feeding a small reservoir. Assuming only dilution, the herbicide dose to an adult drinking 2 liters of this water would be 0.014 mg/kg. This dose is 857 times less than the NOEL for 2,4-D, 500 times less than the NOEL for picloram, and 88 times less than the NOEL for dicamba.

Discussion of Significance of Dose Levels

As presented throughout this analysis, the worst-case doses to the general population generally have very high margins of safety. With but two exceptions, the worst-case dose levels that could possibly be expected under any conditions to members of the general population are all below the Acceptable Daily Intake (ADI) values set by the EPA for these herbicides. Acceptable Daily Intake values are set on a presumption of lifetime exposures and most exposures associated with noxious weed spraying will be quite transient.

For reasons discussed above, the exposure pathways that could result in the highest dose to the general population (i.e., consumption of sprayed wild food and close range spraying of an adolescent), are both very low probability events.

Worst-case worker doses typically have much lower margins of safety, reflecting their more intimate contact with the herbicides. A significant question is whether these margins of safety are sufficient to protect worker health and safety. In determining ADI's for lifetime exposures, EPA typically uses margins of safety of 100 which is the product of a tenfold factor to account for interspecies differences and a tenfold factor to account for effects on sensitive members of the human population. As reviewed in this document, worst-case worker doses have margins of safety of 21 for 2,4-D, 20 for picloram, and 3 for dicamba when compared to the NOEL for any effects for the most sensitive animal species tested. The margins of safety for teratogenic or fetotoxic effects (i.e., effects on fetuses) are 1,429 for picloram, 45 for 2,4-D, and 8 for dicamba.

Several conclusions can be drawn from these findings. First it should be emphasized that women of child-bearing age should be extremely careful when working directly with 2,4-D/dicamba mixes. Restrictions on the use of female applicators may be advisable.

Secondly, all workers must be advised explicitly of the hazards of these chemicals and instructed in the careful herbicide application techniques so as to reduce dose levels below worst-case values assumed here. Several studies have shown that work practices greatly effect worker exposure and dose.

The toxic effects in test organisms at the lowest dose levels of these herbicides generally involve changes in liver and/or kidney functions. These effects are closely related to the duration of dosing. For example, no effects were noted at 7 weeks in rats fed dicamba at the highest levels tested (50 mg/kg). At 13 weeks, rats showed histological changes in the liver at 40 mg/kg but not at 25 mg/kg. By contrast, the no-effect level for a 2-year feeding study is 1 mg/kg. It can be concluded that by limiting the duration of worker dose, effects on liver or kidneys can be avoided. Based on worst-case assumptions of this analysis, no individual worker would apply 2,4-D/dicamba mixtures for more than 10 days on Forest System land.

It is not possible to offer assurances that the teratogenic effects of a herbicide exposure level can be avoided by reducing the length of time of herbicide exposure. It has been shown that many teratogens operate during relatively short time frames or critical periods in pregnancy. These periods generally occur in the early stages of pregnancy, often before pregnancy is confirmed. Thus, it is not the absolute length of exposure that is relevant, but its timing relative to the critical period. Therefore, because of the low teratogenicity margins of safety for workers spraying dicamba, restrictions on the use of women as herbicide applicators are advisable.

The estimated incremental lifetime cancer risks to workers or individuals in the general population would all be lessthan one chance in a million as a result of these projects. The calculation of the probability of cancer is based on a cancer model that overestimates risks, and these risks are below that associated with natural background radiation that people encounter on a daily basis. This level of cancer has also been accepted by other Federal agencies such as FDA and EPA.

Table 1.--Worst-case dose levels to visitors and residents in the vicinity of a large, open-range project sprayed with a picloram mixture.

	Picloram dose (microgram/kg/day)
Adult dermal dose	0.009
Adolescent dermal dose	0.012
Infant dermal dose	0.021
Adult/adolesent oral dose (beef)	7.1
Infant oral dose (beef)	8.3
Adult/adolesecent oral dose (veg)	3.8
Infant oral dose (veg)	4.8
Visitor re-entry to spray site	0.08
Oral dose/sprayed wild food	738

Table 2.--Margins of safety[1] and probabilities of cancer for maximum exposed residents and visitors in the vicinity of a large, open-range project sprayed with picloram.

	Margin of safety	Cancer probability
Adult resident	641	2.24×10^{-8}
Adolescent resident	641	2.25×10^{-8}
Infant resident	533	2.55×10^{-8}
Visitor re-entry	87,500	2.1×10^{-12}
Visitor re-entry with consumption of sprayed wild food	9.5	1.9×10^{-8}

[1] Margins of safety are found by dividing the NOEL for the most sensitive species tested by the total dosage to each maximum exposed individual.

Table 3.--Worst-case daily dose to residents in the vicinity of right-of-way projects sprayed with 2,4-D/dicamba.

	2,4-D/Dicamba dose (microgram/kg/day)	
	2,4-D	Dicamba
Adult dermal dose (60 meters)	0.024	0.034
Adolescent dermal dose (1 meter)	24	32
Infant dermal dose (60 meters)	0.060	0.074
Adult/adolescent oral dose (beef)	0.07	0.07
Infant oral dose (beef)	0.08	0.08
Adult/adolescent oral dose (veg)	0.62	0.43
Infant oral dose (veg)	0.80	0.55
Visitor re-entry	1.08	0.74

Table 4.--Margins of safety[1] and cancer probabilities for maximum exposed residents and visitors in the vicinity of a large, open-range project sprayed with 2,4-D/dicamba mixtures.

	Margin of safety		
	2,4-D	Dicamba	Cancer probability
Adult resident	16,807	2,340	1.7×10^{-9}
Adolescent resident (dermal and oral dose	467	36	6.6×10^{-9}
Adolescent resident (oral doses only)	17,391	2,500	1.7×10^{-9}
Infant resident	12,766	1,775	2.2×10^{-9}
Visitor re-entry with	11,111	1,689	2.1×10^{-9}

[1] Margins of safety are found by dividing the NOEL for the most sensitive species tested by the total dosage to each maximum exposed individual.

Table 5.--Worst-case dose as a result of aquatic contamination from the West Fork spray project.

	2,4-D/Dicamba doses (microgram/kg)		Margin of safety		Cancer
	2,4-D	Dicamba	2,4-D	Dicamba	probabilities
Adult dose (water)	3.9	1.8	3,080	700	7.7×10^{-7}
Adolescent dose (water)	3.9	1.8	3,080	700	7.7×10^{-7}
Infant dose (water)	8.4	4.2	1,430	300	1.7×10^{-6}
Adult dose (fish)	0.9	0.45	13,330	2,780	1.8×10^{-7}
Adolescent dose (fish)	0.9	0.45	13,330	2,780	1.8×10^{-7}
Infant dose (fish)	0.4	0.6	10,000	2,080	7.9×10^{-8}